

## **NESI Part 5 v1\_2**

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# Table Of Contents

NESI Part 5: Net-Centric Developer's Guide .....	1
Perspectives .....	11
Technical Guidance and Tactics .....	16
High-level Guidance .....	17
Interface Design .....	18
Presentation Tier .....	19
Human-Computer Interaction .....	21
Thick Clients .....	23
Middle Tier .....	30
Messaging .....	32
Web Services .....	34
Data Tier .....	48
Software Computing Resources .....	55
Security .....	56
Business Function Element .....	94
Data .....	95
Mediation Services .....	133
Guidance Details .....	135
Best Practices Details .....	373
Glossary .....	459
@ .....	460
A .....	462
B .....	467
C .....	469
D .....	477
E .....	486
F .....	491
G .....	494
H .....	496
I .....	498
J .....	504
K .....	511
L .....	512
M .....	514
N .....	520

O ..... 526

P ..... 530

Q ..... 534

R ..... 535

S ..... 540

T ..... 548

U ..... 552

V ..... 556

W ..... 557

X ..... 561

Y ..... 563

Index ..... 565

# *NESI Part 5: Net-Centric Developer's Guide*

## *NESI Part 5: Net-Centric Developer's Guide*

**Net-centric Enterprise Solutions for Interoperability (NESI)** is a joint effort between the U.S. Navy's Program Executive Office for C4I & Space and the U.S. Air Force's Electronic Systems Center. It provides implementation guidance that facilitates the design, development, maintenance, evolution, and use of information systems for the Net-Centric Operations and Warfare (NCOW) environment. NESI has also been provided to other Department of Defense (DoD) services and agencies for potential adoption.

NESI Implementation guidance applies to all phases of the acquisition process as defined in references [\(a\)](#) and [\(b\)](#). NESI comprises six parts, each focusing on a specific area of guidance. *NESI Part 1: Net-centric Overview* describes each part in detail.

NESI provides guidance on software development, best practices, and examples for developing Net-Centric software. It is aligned with the design principles of reference [\(o\)](#). NESI is not a replacement for references [\(h\)](#), [\(m\)](#), or [\(n\)](#).

The overall goal is to provide common, cross-service guidance in measurable terms for the program managers and developers over the lifecycle of net-centric solutions. The objective is not to replace or repeat existing standards or guidance, but to organize, clarify, and reconcile conflicting mandates around the acquisition process..

NESI subsumes a number of references and directives: in particular, the Air Force *C2 Enterprise Technical Reference Architecture (C2ERA)*[\[1\]](#) and the Navy *Reusable Applications Integration and Development Standards (RAPIDS)*[\[2\]](#) Initial authority for NESI is per the Memorandum of Agreement between Commander, Space and Naval Warfare Systems (SPAWAR), PEO C4I & Space, and the United States Air Force Electronic Systems Center, dated 22 December 2003, Subject: Cooperation Agreement for Net-Centric Solutions for Interoperability (NESI).

In addition to references [\(a\)](#) through [\(q\)](#), Navy PEO C4I has mandated a software maintenance policy for its programs that requires the use of *NESI Part 3: Net-Centric Migration Guidance*.

NESI is intended to help programs comply with the DoD Net-Centric directives, instructions, and other guidance documentation (listed as references [\(a\)](#) through [\(q\)](#)). This guidance will continue to evolve as direction and our understanding of the requirements of net-centricity evolve. NESI will be updated to reflect changes to the guiding documents and new regulations.

[1] Air Force C2 Enterprise Technical Reference Architecture, v3.0-14, 1 December 2003.

[2] RAPIDS Reusable Application Integration and Development Standards, Navy PEO C4I & Space, December 2003 (DRAFT V1.5), <https://nesi.spawar.navy.mil>.

[3] Software Maintenance Policy, Department of the Navy, Navy PEO C4I & Space, 14 June 2004.

## *References*

(a) DoD Directive 5000.1, The Defense = Acquisition System, 24 November 2003.

- (b) DoD Instruction 5000.2, Operation of the = Defense Acquisition System, 12 May 2003.
- (c) DoD Directive 8100.1, Global Information = Grid (GIG) Overarching Policy, 21 November 2003.
- (d) DoD Directive 4630.5, Interoperability and = Supportability of Information Technology (IT) and National Security = Systems (NSS), 05 May 2004.
- (e) DoD Instruction 4630.8, Procedures for = Interoperability and Supportability of Information Technology (IT) and = National Security Systems (NSS), 30 June 2004.
- (f) DoD Directive 5101.7, DoD Executive Agent = for Information Technology Standards, 21 May 2004.
- (g) DoD Global Information Grid (GIG) = Architecture, Version 2.0, August 2003.
- (h) DoD Joint Technical Architecture, Version = 6.0, 3 October 2003.
- (i) DoD Net-Centric Data Strategy, DoD Chief = Information Officer, 9 May 2003.
- (j) CJCSI 3170.01D, Joint Capabilities = Integration and Development System, 12 March 2004.
- (k) CJCSM 3170.01A, Operation of the Joint = Capabilities Integration and Development System, 12 March 2004.
- (l) CJCSI 6212.01C, Interoperability and = Supportability of Information Technology and National Security Systems, 20 November = 2003.
- (m) Net-Centric Operations and Warfare = Reference Model (NCOW RM) V1.0, September 2003.
- (n) Net-Centric Checklist, V2.1.3, Office of = the Assistant Secretary of Defense for Networks and Information = Integration/Department of Defense Chief Information Officer, 12 May = 2004.
- (o) A Modular Open Systems Approach (MOSA) to = Acquisition, Version 2.0, September 2004.
- (p) DoD IT Standards Registry (DISR), <http://disronline.disa.mil>.
- (q) Net-centric Attributes List, Office of the = Assistant Secretary of Defense for Networks and Information = Integration/Department of Defense Chief Information Officer, June 2004.

## *Releasability Statement*

This document has been cleared for public release by competent authority in accordance with DoD Directive 5230.9 and is granted Distribution Statement A: Approved for public release; distribution is unlimited. You may obtain electronic copies at <https://nesi.hanscom.af.mil> or <http://nesipublic.spawar.navy.mil>.

## *Vendor Neutrality*

The NESI documentation sometimes refers to specific vendors and their products in the context of examples and lists. However, NESI is vendor-neutral. Mentioning a vendor or product is not intended as an endorsement, nor is a lack of mention intended as a lack of endorsement.

Code examples typically use open-source products, since NESI is built on the open-source philosophy. Since NESI accepts contributions from multiple sources, the examples also tend to reflect whatever tools the contributor was using or knew best. However, the products described are not necessarily the best choice for every circumstance. You are encouraged to analyze your specific project requirements and choose your tools accordingly. There is no need to obtain, or ask your contractors to obtain, the open-source tools that appear as examples in this guide. Similarly, any lists of products or vendors are intended only as references or starting points, and not as a list of recommended or mandated options.



## *Disclaimer*

Every effort has been made to make this documentation as complete and accurate as possible. It is expected that the documentation will be updated frequently, and will not always immediately reflect the latest technology or guidance.

## *Contributions and Comments*

NESI is an open-source project that will involve the entire development community. Anyone is welcome to contribute comments, corrections, or relevant knowledge to the guides. For Navy contributions, send email to [nesi@spawar.navy.mil](mailto:nesi@spawar.navy.mil). For Air Force contributions, send email to [nesi@hanscom.af.mil](mailto:nesi@hanscom.af.mil).

## *Open-Source Site*

The Navy has established an open-source site to support community involvement. It is located at <https://nesi.spawar.navy.mil>. This evolved from the Navy RAPIDS initiative. Use this site for collaborative software development across distributed teams.

## *NESI Development Guidance*

This developer's guide provides chief engineers and software developers with detailed implementation guidance for applications, services, and data. This effort leverages current best practices from the software development community to enable the DoD to create net-centric, extensible, scalable enterprise applications. The goal is to modernize and improve the development of Net-Centric applications and services as critical warfighter capabilities.

Software developers can choose to use published applications via interfaces and services or build applications and services that interface with the infrastructure. Any application that must interoperate in the DoD Net-Centric enterprise should be built and maintained in accordance with the standards, policies, and processes within this guide.

The tactics described in this document are designed to:

- Permit independent paces of development and change on each side of the enterprise, reducing risk and impacts of changes to application developers.
- Implement connection strategies that extend the life and reach of legacy applications while legacy application developers restructure their systems.

## Documentation Structure

This document provides developers with detailed software development guidance, best coding practices, lessons learned, and code samples. It is intended as a reference, not a document to be read cover to cover.

The contents follow this basic structure:

<b>Overview</b>	Describes the topic in terms suitable for the entire NESI audience, and lists future topics that may be covered in that area
<b>Guidance</b>	Lists contractual statements relating to the topic.
<b>Best practices</b>	Contains lessons learned from industry and the DoD, design patterns, code snippets, and configuration examples; developers can augment their efforts by leveraging and reusing this information
<b>Examples</b>	Provides code samples that illustrate the guidance and best practices. For a statement about the choice of tools, see the <a href="#">Vendor neutrality</a> disclaimer.
<b>Glossary</b>	Defines jargon and terms used in a specific sense.
<b>References</b>	Lists of books, web sites, and other sources of information that may assist the planning or development effort.

Program managers and chief engineers will find the overview and guidance sections helpful while:

- Directing their programs and activities to build systems. Use this information in combination with [NESI Part 2: Net-Centric ASD \(NII\) Checklist Guidance](#) and [NESI Part 4: Net-Centric Node Design Guidance](#).
- Reviewing Statements of Work. (Developers may also use the information for this purpose.)
- Reviewing deliverables for compliance.
- Migrating legacy systems to the net-centric environment. Use this information in combination with [NESI Part 3: Net-Centric Migration Guidance](#).



# *Perspectives*

## *Perspectives*

The volume of information within the Net-centric Enterprise Solutions for Interoperability (NESI) is vast and complex. It covers a wide range of subjects and topics and provides hundreds of guidance statements. To aid in browsing, the document is organized into perspectives. Each Perspective tells a story and provides access to the Guidance and Best Practice details that support the story. Any individual person is generally not interested in the entirety of NESI but is rather interested in information germane to their field of expertise. For example, on any given project one person might only be interested in the human interface, another person might be interested in the persistent data and another person might be interested in security. Each of these people has a different view point on what needs to be done on the project. These different view points are the basis for NESI Perspectives. As described above, a NESI Perspective can be used to aid a person in finding information or it can be used to classify Guidance and Best Practice details into well known categories. For example, the Metadata Registry Perspective identifies all the Guidance Details and Best Practices that relate to Metadata registries. If a Profile, Program, or Project requires the use of a Metadata Registry, then this Perspective encapsulates the needed Guidance and Best Practices.

### Complex Perspective

A complex perspective is one that provides an encapsulation of other perspectives

### Detailed Perspective

A detailed perspective is one that encapsulates guidance details, best practice details, examples, references and glossary entries that pertain to a specific subject. It must minimally contain an overview or introductory paragraph and at least one reference to a Guidance Detail.

**Note:** Perspectives are **not** intended to be binding in nature, but are provided as a convenient way to access guidance details, best practices details, examples, references and glossary documents components related to a particular subject.

## Complex Perspectives

A complex perspective is one that provides an encapsulation of other perspectives. It covers higher level complex subjects that further broken down into other subjects. There are no rules as to how many perspectives can be referenced by a perspective or how many times a perspective can be referenced by other perspectives.

### Browser-based clients

This section provides guidance for creating and interfacing to thin clients. It covers the following topics:

- [GUI design](#)
- [XML rendering](#)
- [Active Server Pages \(ASP\)](#)
- [Active Server Pages for .NET \(ASP.NET\)](#)
- [Java server pages \(JSP\)](#)

References

- For answers to frequently asked questions about cascading style sheets, see <http://www.blooberry.com/indexdot/css/topics/stylefaq.htm>.
- *Don't Make Me Think* by Steve Krug (ISBN 0-7897-2310-7)
- *Creating Killer Interactive Web Sites by Adjacency* (ISBN 1-56830-373-4)
- *Designing Web Usability* by Jakob Nielsen (ISBN 1-56205-810-X)

}

References to other perspectives



## *Detailed Perspectives*

A detailed perspective is one that encapsulates guidance details, best practice details, examples, references and glossary entries that pertain to a specific subject.

## GUI design

Browser-based clients display web pages. A web page consists of **HTML** that is downloaded from a **web server** and rendered inside a browser. Web pages are generated by the using technologies like **Active Server Pages**, **Java Server Pages**, **servlets**, and **CGI scripts**.

Glossary references

### Guidance

- Do not deviate from **W3C** standards. Code should not use vendor-specific add-on features. [G1835]
- File type must match the content. [G1837]
- Decouple the graphical style from the content format. [G1843]
- Web documents shall comply with Disability Act Guidelines. [G1844]

Guidance Details references

### Best practices

- Use one of these standard fonts in web pages, in this order of preference: Verdana, Universal, Sans Serif. Do not use Times New Roman. [BP1838]
- Do not underline any text unless it is a link. [BP1839]
- Use hex codes for all colors (e.g., #FFFF33), never the color name (e.g., yellow). [BP1840]
- Do not change the default colors of the links. [BP1841]
- Do not build a **web page** where the horizontal width is greater than the screen. Vertical scrolling is fine. Plan for the lowest common denominator to be super-VGA resolution or 600 x 800. [BP1842]

Best Practice Details references

### References

- **HTML HEX color tables** – [http://webmonkey.wired.com/webmonkey/reference/color\\_codes/](http://webmonkey.wired.com/webmonkey/reference/color_codes/)
- **W3C definition** – <http://www.w3.org/Consortium/>
- **Disability Act Guidelines** – <http://www.w3.org/WAI/>
- **HTML** – [http://search.windows.com/definition/0\\_sid26\\_gc212286\\_00.html](http://search.windows.com/definition/0_sid26_gc212286_00.html)
- **JSP** – <http://www.webopedia.com/TERM/J/JSP.html>
- **CGI** – <http://www.w3.org/CGI/> and <http://hochoo.acsa.uiuc.edu/cgi/intro.html>
- **JavaScript** – <http://www.mozilla.org/js/>

External References



## Technical Guidance and Tactics

### *Technical Guidance and Tactics*

This section contains guidance on the following topics:

[High-level Guidance](#)

[Interface Design](#)

Future guidance will include:

- **Design patterns and examples:** Recommended patterns and implementations
- **Developer's Toolkit creation:** Toolkit containing a jumpstart/quick start guide, developer's guide, sample code, automated test drivers and certification tools, and access to open-source sites.
- **Enterprise Checklist:** Overview of actions prior to enterprise deployment.
- **Error handling:** Error management processes and guidelines.
- **Interface management:** Public interface management processes and guidelines.
- **Logging management:** Logging and auditing processes and guidelines.

**Note:** This guidance may be moved to other sections of the [NESI](#) documentation, as appropriate.

## High-level Guidance

### *High-level Guidance*

This section lists high-level guidance for developing [Net-Centric](#) software. The remainder of this document provides more detailed guidance on specific topics. Adhering to the guidance in this document will minimize impacts to programs and help manage change.

[Publish and insulate public interfaces](#)

[Implement a component-based architecture](#)

[Automate the software build process](#)

## Interface Design

### *Interface Design*

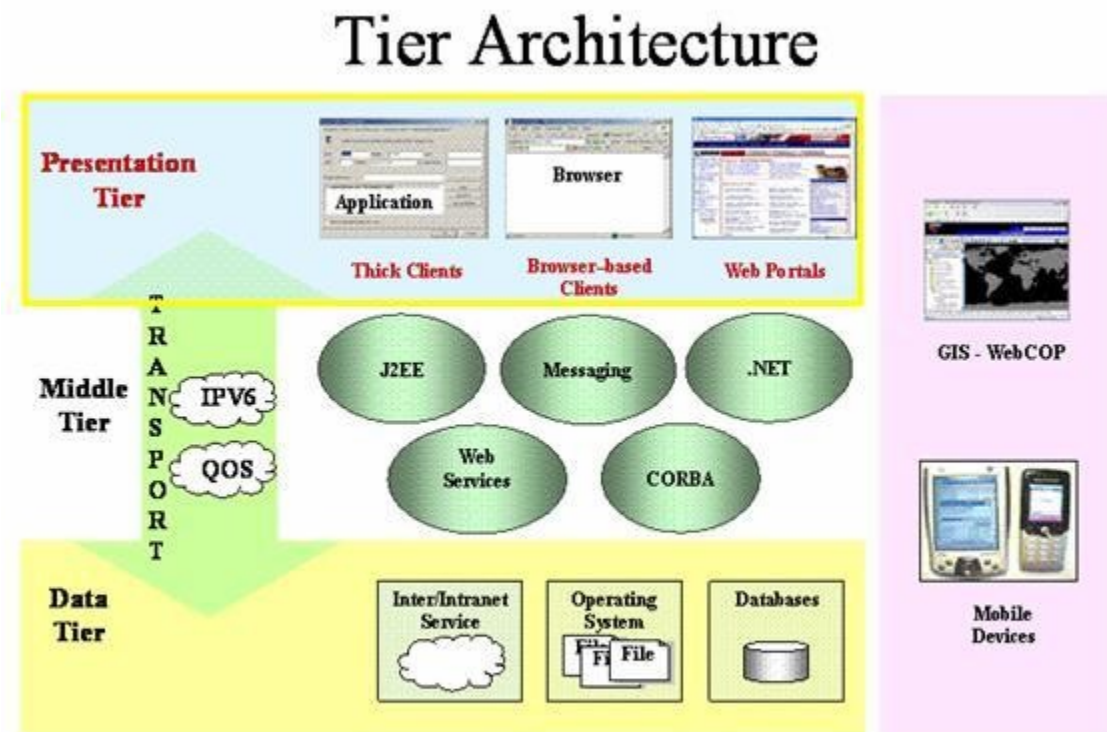
This section provides guidance on the following topics:

- [Public Interface Design](#)
- [Standard Interface Documentation](#)

# Presentation Tier

## *Presentation Tier*

The presentation tier represents all the components used to generate an interactive display that enables users to communicate with applications. The components of a presentation tier are not necessarily in the same physical location. The presentation tier communicates with the middle tier to make requests and retrieve data from the data tier. The presentation tier then shows the [end user](#) the data retrieved from the middle tier. Components located in the middle tier that build [web pages](#) for display are considered part of the presentation tier.



## Guidance

- Validate all input fields. [[G1032](#)]

Future guidance will include:

- [Web Browser](#) setup/configuration: [Web application](#) configurations for [portals](#) and [browsers](#), security configurations.
- [JavaScript](#)
- [.NET](#) Smart Clients

- Java [servlets](#) and [Java Server Page \(JSP\)](#)s
- Java [applets](#)
- [Active X](#)
- Hypertext Preprocessor (PHP)
- Terminal [services](#)/Stateless [clients](#)
- Design patterns and examples: Recommended patterns and implementations.
- [Portal](#) strategies: Additional cross-references for new DoD [portals](#) initiatives and guidance.
- Security guidelines: [Authentication](#) schemes, secure coding practices, [digital certificates](#), [digital signatures](#), firewall policies, protection mechanisms, and [SSL](#).

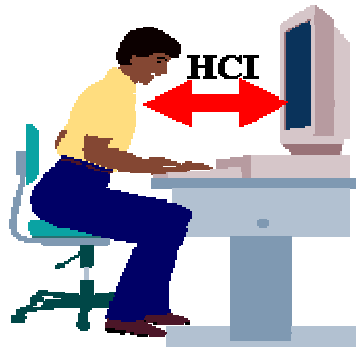
Note: That this guidance may be moved to other sections of [NESI \(Net-Centric Enterprise Solutions for Interoperability\)](#). A joint effort between the U.S. Navy's Program Executive Office for C4I & Space and the U.S. Air Force's Electronic Systems Center. It provides a reference architecture, implementation guidance, and a set of reusable software components. These facilitate the design, development, maintenance, evolution, and use of information systems for the [Net-Centric Operations and Warfare \(NCOW\)](#) environment, documentation, as appropriate.



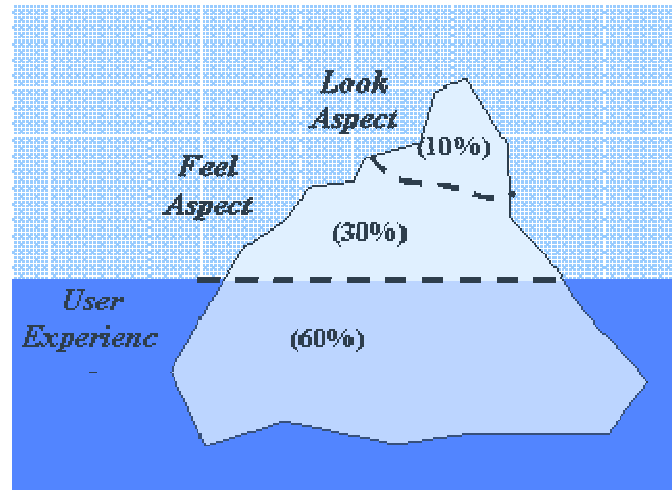
## Human-Computer Interaction

### *Human-Computer Interaction*

Human-Computer Interaction (HCI) is the study, planning, and design of the interaction between humans and computers. It consists of three parts: the end user, the computer itself, and the ways they work together.



Traditionally, HCI only had two aspects for the development of usable applications: Look and Feel. However, there is strong rationale for adding a third aspect, the User Experience and that the Look and Feel aspects are just the tips of the HCI iceberg. It has been estimated that the Look comprises only about 10% of the total usability of an application and that the Feel is another 30%. The User Experience determines the remainder 60% of the usability.



## Thick Clients

### *Thick Clients*

A thick client (often called "fat client") can be defined as a client machine in a client/server environment that performs most or all of the application processing with little or none performed in the server.

## Guidance

- Use a standard [Graphical User Interface \(GUI\) component](#) library. [[G1030](#)]

## References

- AWT - <http://java.sun.com/products/jdk/awt/>
- Swing - <http://java.sun.com/products/jfc/>
- Thick client - <http://www.jargonsoft.com/m2/tech/JargonWhitePaper.html>

## Browser-Based Clients

### *GUI Design*

Browser-based clients display [web pages](#). A [web page](#) consists of [HTML](#) and [JavaScript](#) that is downloaded from a web site and rendered inside a browser. [Web pages](#) are generated by the web server using technologies like [Active Server Pages](#), [Java Server Pages](#), servlets, and CGI scripts. Since browsers adhere to standards differently, [web pages](#) should be tested in multiple target browsers to ensure proper layout and functionality.

### Guidance

- Do not deviate from W3C standards. Code should not use vendor-specific add-on features. [\[G1035\]](#)
- Decouple the graphical style from the content format. [\[G1043\]](#)
  - Web documents shall comply with Disability Act Guidelines. [\[G1044\]](#)

### Best Practices

- Use one of these standard [fonts](#) in [web pages](#), in this order of preference: Verdana, Universal, Sans Serif. Do not use Times New Roman. [\[BP1038\]](#)
- Do not underline any text unless it is a link. [\[BP1039\]](#)
- Use hex codes for all colors (e.g., #FFFF33), never the color name (e.g., yellow). [\[BP1040\]](#)
- Do not change the default colors of the links. [\[BP1041\]](#)
- Do not build a [web page](#) where the horizontal width is greater than the screen. Vertical scrolling is fine. Plan for the lowest common denominator to be super-VGA resolution or 600 x 800. [\[BP1042\]](#)

### References

- HTML HEX color tables – [http://webmonkey.wired.com/webmonkey/reference/color\\_codes/](http://webmonkey.wired.com/webmonkey/reference/color_codes/)
- W3C definition – <http://www.w3.org/Consortium/>
- Disability Act Guidelines – <http://www.w3.org/WAI/>
- HTML - [http://searchwebservices.techtarget.com/sDefinition/0,,sid26\\_gci212286,00.html](http://searchwebservices.techtarget.com/sDefinition/0,,sid26_gci212286,00.html)
- JSP - <http://www.webopedia.com/TERM/J/JSP.html>
- CGI - <http://www.w3.org/CGI/> and <http://hoohoo.ncsa.uiuc.edu/cgi/intro.html>
- JavaScript - <http://www.mozilla.org/js/>

## ***XML Rendering***

Using the architecture shown in Parsing XML strategies, XML can render display-device-neutral output to a particular output device given a set of display rules or a [style sheet](#). The XSLT file is the decoupled output formatter that determines how the output device renders the data.

### **Guidance**

- Define XML format information separately in XSL. [\[G1045\]](#)

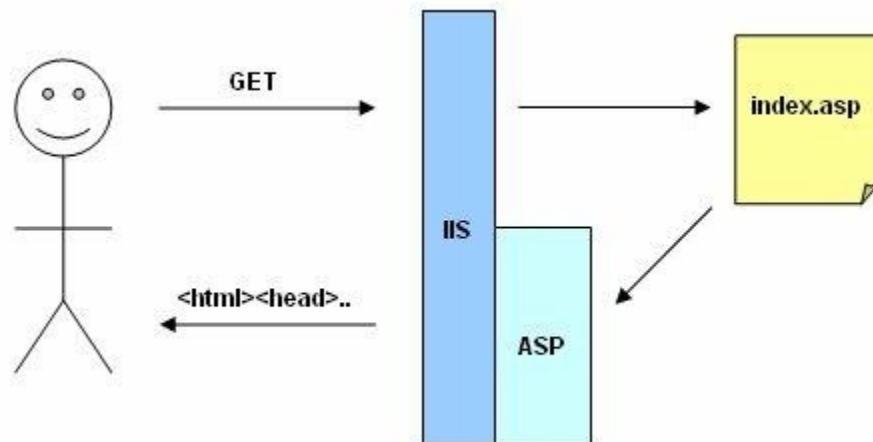
### **References**

- XSL – definition of XSL in Encyclopedia - <http://encyclopedia.laborlawtalk.com/XSL>

## Active Server Pages (ASP)

Active Server Pages (ASP) are scripts that are executed by Microsoft Internet Information Services (IIS). The output is returned to the end user as HTML. Typically, an ASP script generates a customized web page on the fly before sending it to the end user.

- Active Server Pages:
  - Are specific to Microsoft
  - Only run on IIS or PWS.
  - Can contain HTML, Jscript, and VBScript
  - Can access Component Object Model (COM) Component



## Guidance

- Do not use ActiveX controls. [G1049]
- In ASP, isolate the presentation tier from the middle tier using Component Object Model (COM) objects. [G1050]

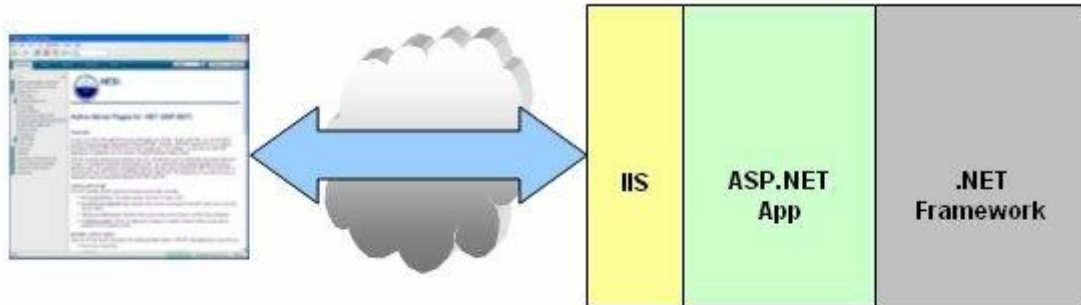
## References

- ActiveX Control definition - [http://isp.webopedia.com/TERM/A/ActiveX\\_control.html](http://isp.webopedia.com/TERM/A/ActiveX_control.html)
- Component Object Model definition - [http://isp.webopedia.com/TERM/C/Component\\_Object\\_Model.html](http://isp.webopedia.com/TERM/C/Component_Object_Model.html)
- JScript definition - <http://isp.webopedia.com/TERM/J/JScript.html>
- IIS – definition of IIS in Encyclopedia - <http://encyclopedia.laborlawtalk.com/IIS>
- Personal Web Server – a Whatis.com definition - [http://searchwebservices.techtarget.com/sDefinition/0,,sid26\\_gci296469,00.html](http://searchwebservices.techtarget.com/sDefinition/0,,sid26_gci296469,00.html)
- HTML – a Whatis.com definition - [http://searchwebservices.techtarget.com/sDefinition/0,,sid26\\_gci212286,00.html](http://searchwebservices.techtarget.com/sDefinition/0,,sid26_gci212286,00.html)

- VBScript definition from The Glossary of Internet Terms -  
<http://www.strategicwebventures.com/definitions/Glossary/VBScript/>

## Active Server Pages for .NET (ASP.NET)

Microsoft .NET uses ASP.NET for web applications. ASP.NET requires Microsoft [Internet Information Services \(IIS\)](#) or Apache 2.0-based enterprise-ready services.



ASP.NET improves upon ASP. It has more features than [Java Server Page \(JSP\)](#). An extensible web technology that uses static data, [JSP](#) elements, and server-side Java objects to generate dynamic content for a client. Typically the static data is [HTML](#) or XML elements, and in many cases the client is a web browser. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html>), such as code-behind and event-driven. An application that responds to events. web controls. However, [Java Server Faces](#), framework for building user interfaces for web applications. It includes (1) A set of APIs for representing UI components and managing their state, handling events and input validation, defining page navigation, and supporting internationalization and accessibility; (2) A [Java Server Page \(JSP\)](#) custom tag library for expressing a JavaServer Faces interface within a [JSP page](#) should bring [JSP](#) to the level of ASP.NET in the future.

### Guidance

- Use the code-behind feature in ASP.NET to separate presentation code from the business logic. [\[G1052\]](#)
- Do not embed [Hypertext Markup Language \(HTML\)](#) code in any code-behind code used by ASPX pages. [\[G1053\]](#)
- Use fully qualified, registered namespaces with identity information for all custom controls. [\[G1055\]](#)
- Specify a versioning policy for .NET assemblies. [\[G1056\]](#)

### References

- HTML – a Whatis.com definition - [http://searchwebservices.techtarget.com/sDefinition/0,,sid26\\_gci212286,00.html](http://searchwebservices.techtarget.com/sDefinition/0,,sid26_gci212286,00.html)
- What is JSP? - <http://www.webopedia.com/TERM/J/JSP.html>
- JavaServer Faces - [http://java.sun.com/j2ee/javaxserverfaces/faq.html#what\\_is\\_jsf](http://java.sun.com/j2ee/javaxserverfaces/faq.html#what_is_jsf)



## *Java Server Pages (JSP)*

[Java Server Page \(JSP\)](#) technology enables web developers and designers to rapidly develop and easily maintain information-rich, [dynamic web pages](#) that leverage existing business systems. As part of the Java technology family, [JSP](#) technology enables rapid development of platform-independent, web-based applications. [JSP](#) technology separates the user interface from content generation, enabling designers to change the overall page layout without altering the underlying dynamic content.

### Java Server Pages:

- Are similar to ASPs.
- Can contain [HTML](#), Java code, and JavaBean components
- Provide a powerful, [dynamic web page](#) assembly mechanism
- Are platform-independent
- Are compiled into Servlets at runtime; on most application servers, this occurs only the first time they are invoked

## Guidance

- Java code used in [Java Server Pages \(JSPs\)](#) shall be encapsulated in tag libraries. [[G1060](#)]

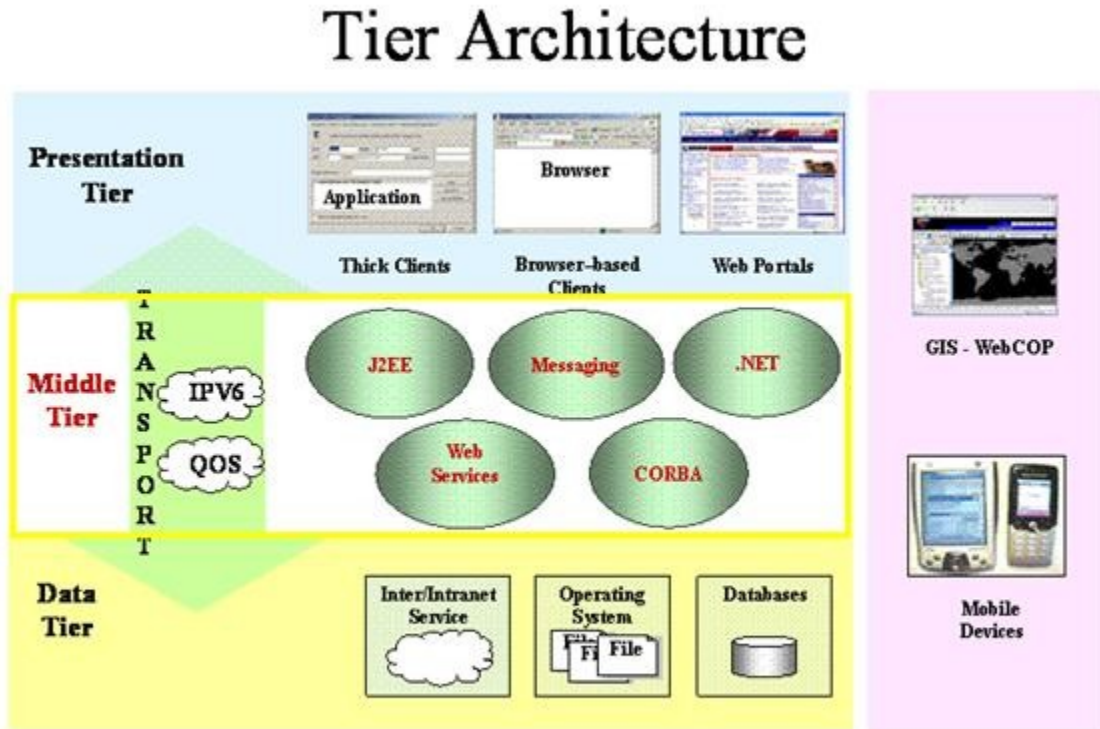
## References

- JavaBeans definition - <http://isp.webopedia.com/TERM/J/JavaBeans.html>
- Model-view-controller - a Whatis.com definition - [http://whatis.techtarget.com/definition/0,,sid9\\_gci214607,00.html](http://whatis.techtarget.com/definition/0,,sid9_gci214607,00.html)
- Java Servlets definition - <http://www.fromallangles.com/glossary/web-hosting/terms/java-servlets.htm>

## Middle Tier

### *Middle Tier*

The middle tier provides process management services such as process development, monitoring, and resourcing, that are shared by multiple applications.



Future guidance will include:

**Application collaboration/Mediation framework:** Also known as backend integration application communication.

**Application concurrency control:** Concurrency and locking strategies and guidelines for applications required to operate in a multi-user environment. Transactional strategies for operations with other services in the enterprise.

**Application server guidelines:** Sybase application server topics, transactions, and data access guidelines.

**Connection strategies:** Applications written in or using Fortran, Ada, C/C++, Cold Fusion, [Java](#), [J2EE](#), Microsoft Office, and [.NET](#).

**CORBA:** *Real-time* topics, cross-vendor interoperability issues, enterprise connection strategies, and Software Communication Architecture (*SCA*) issues.

**Design patterns and examples:** Recommended patterns and implementations.

**Microsoft component model:** .NET, COM/DCOM, COM+, security, and data-access guidelines.

**Microsoft Office:** Connector strategies to and from the enterprise.

**Middleware guidelines:** Guidelines on developing connectors to and from the enterprise.

**Other application server operations:** JBoss, Orion, Sybase EAServer.

**Security guidelines:** Authentication schemes, secure coding practices, digital certificates, digital signatures, firewall policies, protection mechanisms, and [SSL](#).

**Transactional strategies:** For operations with other services in the enterprise.

**Web services:** [UDDI](#) operations and taxonomies.

**Note:** This guidance may be moved to other sections of the [NESI](#) documentation, as appropriate.

## Messaging

### *Messaging*

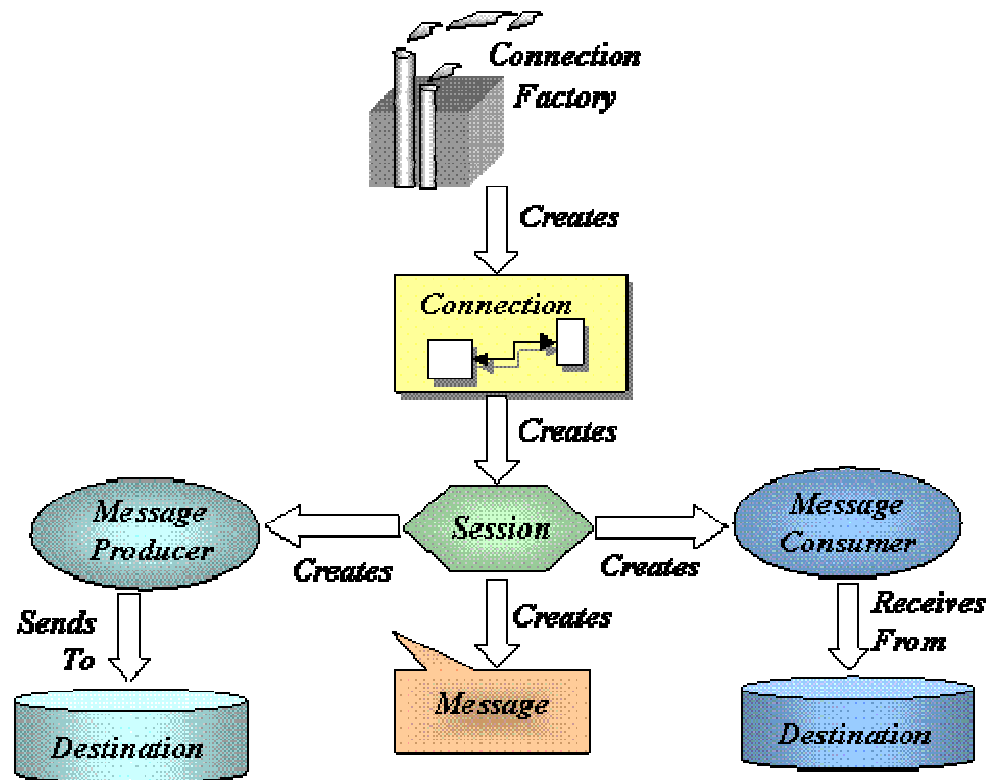
The explosion of the Internet required applications to communicate and interoperate with other applications and services. Messaging systems play an important role in enterprise applications because computers and networks are inherently unreliable and messaging systems are perfectly suited to operate in disconnected environments. They provide a reliable, secure, event-driven message-delivery communication mechanism. Unlike traditional [RPC](#)-base systems ([RMI](#) or [CORBA](#)), most message-oriented base systems operate peer-to-peer.

The messaging paradigm offers three major advantages.

- Allows applications to communicate asynchronously. This means the system sending the [message](#) does not have to wait around for a response.
- Provides more robustness and reliability; [messages](#) do not get lost if a [client](#) has crashed or is unavailable.
- Multiplexes [messages](#) and sends them to multiple [clients](#)

There are other advantages such as transactional [message](#) support, [message](#) prioritization, load balancing, and firewall [tunneling](#). However, these features usually depend on how the [Message-Oriented Middleware \(MOM\)](#) is implemented.

This diagram shows the relationship of the classes and interfaces in the [Java Message Service\(JMS\) API](#). Developers use these classes and interfaces to create a [JMS](#) application.

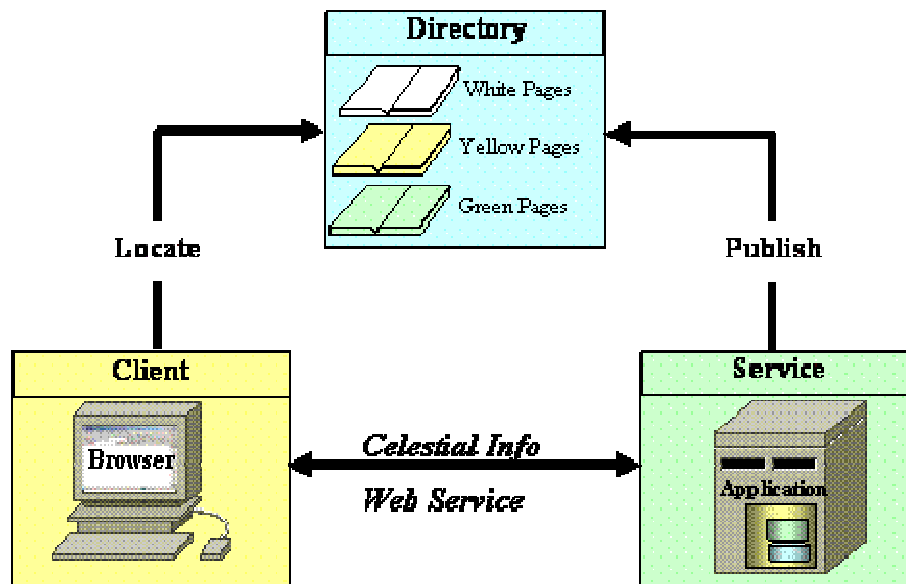


## Web Services

### Web Services

A [web service](#) is an application that exists in a distributed environment, such as the [Internet](#). A [web service](#) accepts a request, performs its function based on the request, and returns a response. The request and the response can be part of the same operation, or they can occur separately, in which case the consumer does not need to wait for a response. Both the request and the response usually take the form of [XML](#), use a portable data-interchange format called [SOAP](#), and are delivered over a [wire protocol](#), such as [HTTP](#).

[Web service](#) can reside on top of existing legacy applications and expose services to the net. The [web services](#) architecture illustrated below implements the [service-oriented architecture](#) pattern. For more information on design patterns, see [Web Service Patterns: Java Edition](#) by Paul B. Monday.



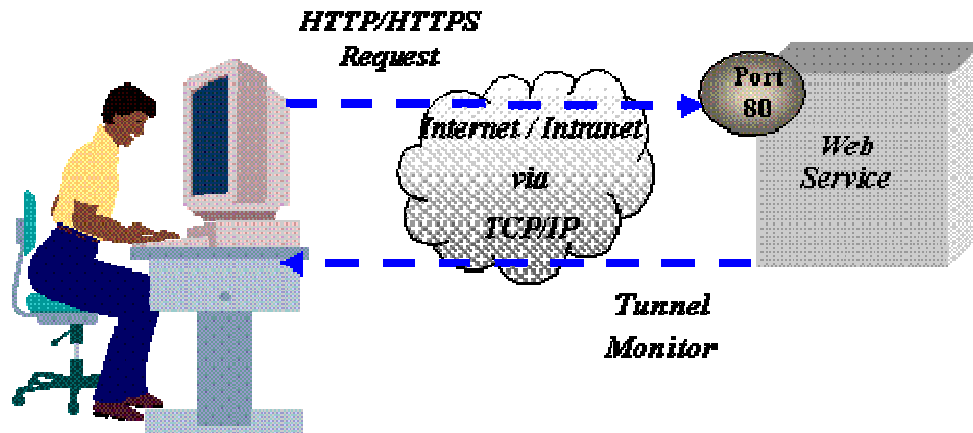

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### Web Service Models

[Web services](#) have traditionally been used to connect people to [services](#). However, as the [web service infrastructure](#) has matured, a new model has emerged, the service-to-service model.

#### Traditional Model

In a classic [web service](#), a request is usually made to a [web service](#) using a [web browser](#). The request is submitted to the [web service](#) using [HTTP](#) or [HTTPS](#) over the [internet](#) or an [intranet](#). The [web service](#) processes the request and returns an [HTML](#) page that can be displayed in a [web browser](#).

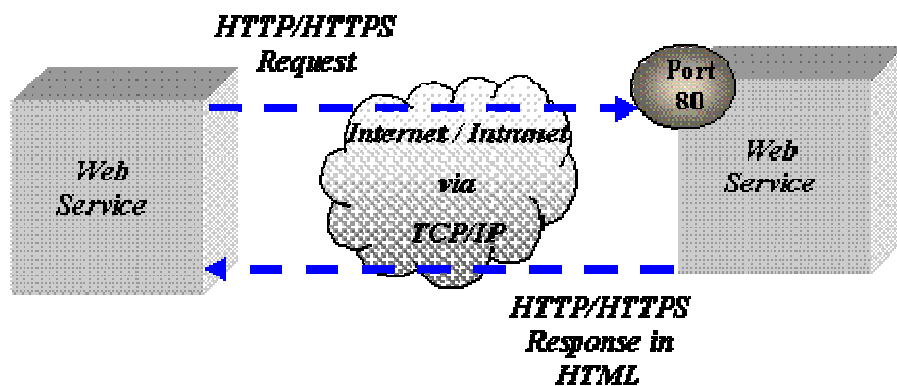


A classic [web service](#) has the following characteristics:

- Web page appears via a [web browser](#)
- Connection is via [TCP/IP](#)
- Transport is [HTTP/HTTPS](#)
- Message format is [HTML](#)

### Service-to-Service model

[Application servers](#) used to be responsible for providing machine-to-machine services. Now [web servers](#) can handle similar work. The [web server](#) can pass a request as an [XML](#) payload embedded in a [TCP/IP](#) and [HTTP](#) request, process the data, and respond. The response is typically in the form of an [HTML web page](#) or an [XML](#) payload that a [client](#) application can use.



Machine-to-machine [web services](#) have the following characteristics:

- Two independent applications
- Two independent [servers](#)
- Connection is via [TCP/IP](#)

- Transport is [HTTP](#) (port 80)
- Message format is [XML](#) payload in [SOAP](#) format

### Key characteristics

Some key characteristics of [web services](#) are:

- High-overhead interactions; may be too heavy for some applications
- [Loosely coupled](#) collaborators (e.g., [client/server](#))
- Multiple layers of [parsing](#), [marshalling](#), and un-[marshalling](#)
- Non-standard content
- Standard interaction [protocol](#)
- No support for [services](#) such as [messaging](#) and security
- Infant technology
- No support for pass-by-reference

## Guidance

- Validate all [WSDL](#) ([Web Services Definition Language](#)) files that describe [web services](#). [G1087]
- Use isolation design patterns such as [façade](#), [proxy](#), or [adapter](#) to isolate the application from the connection and manipulation of [SOAP messages](#). [G1088]
- Do not hard-code a [web service's endpoint](#). [G1090]

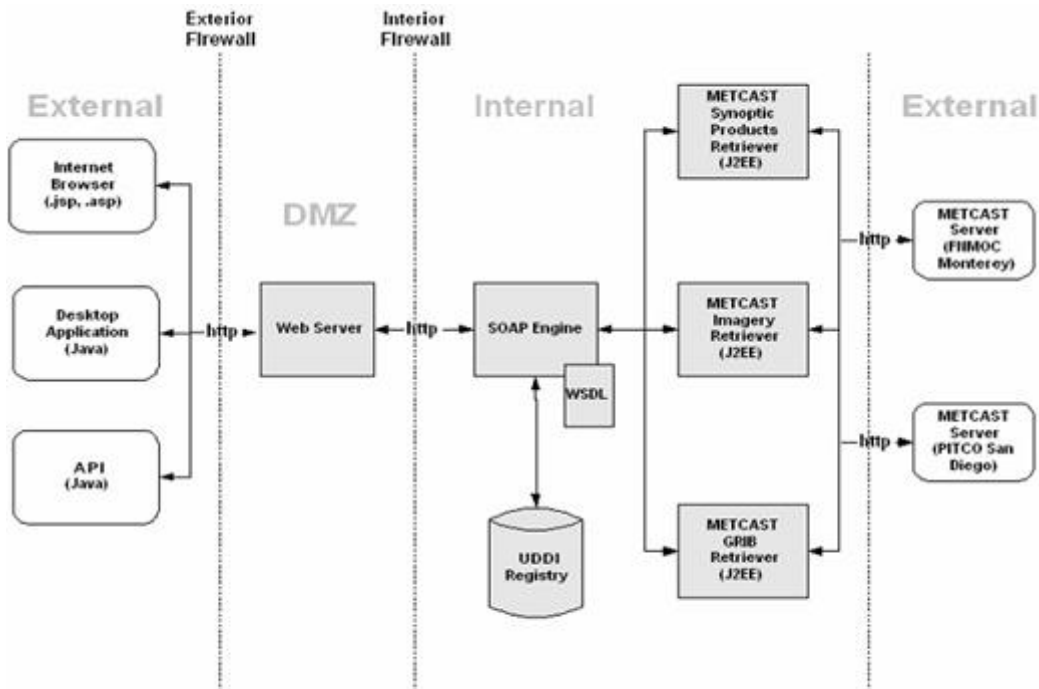
## Examples

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### *Navy operational example: Exposing web services for METOC*

The following figure shows a simplified example of the architecture, illustrating a METOC metcast application that uses [SOAP](#) as a [proxy](#) to legacy content.



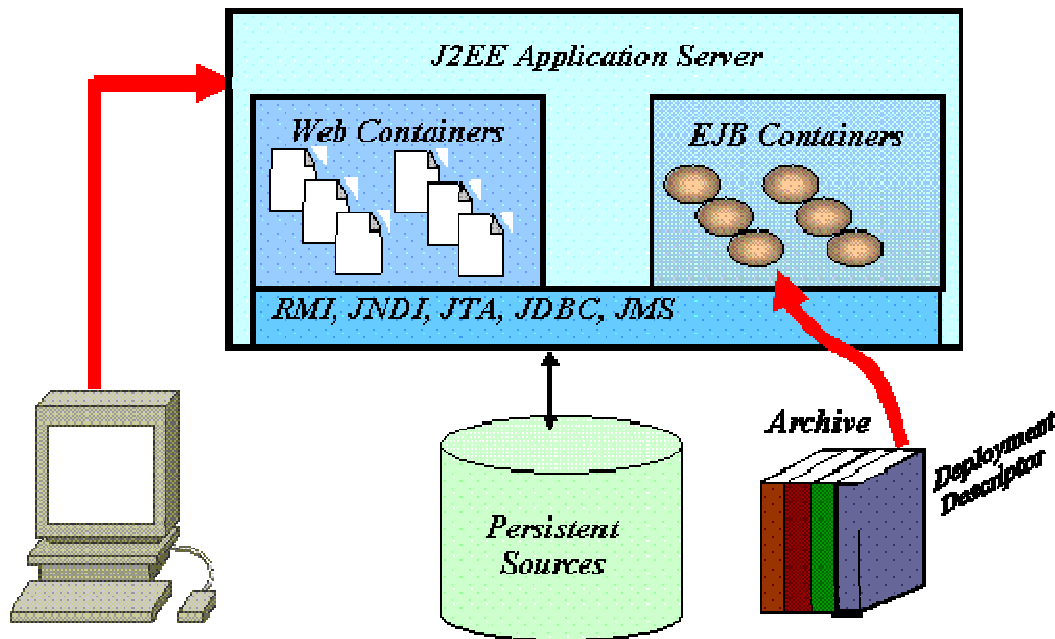


## References

- SOAP definition - <http://sbc.webopedia.com/TERM/S/SOAP.html>
- Web Service Definition Language (WSDL) - <http://www.w3.org/TR/wsdl>
- Adapter pattern - <http://c2.com/cgi/wiki?AdapterPattern>
- Design patterns: Proxy - <http://www.dofactory.com/Patterns/PatternProxy.aspx>
- Façade pattern - <http://c2.com/cgi/wiki?FacadePattern>

## J2EE Environment

Java has been extended to handle the complexity of enterprise computing through the Java 2 Enterprise Edition (J2EE) environment there are multiple deployment descriptors that correspond to the type of modules being deployed. The deployment descriptors are contained in the enterprise archive file (EAR). A deployment descriptors is an XML file that is inside an Java archive file. It describes the contents of the Java archive file and explicit instructions on how the application server's J2EE-compliant container needs to be configured to run the application.



The table below shows the J2EE standard deployment descriptor files and the specific applications to which they apply. See <http://java.sun.com/dtd/> for details of each XML file.

Component or Application	Scope	Deployment descriptors	Packaging archives
Web application	<a href="#">J2EE</a>	<b>web.XML</b>	<a href="#">.war</a>
Enterprise bean	<a href="#">J2EE</a>	<b>ejb-jar.XML</b>	<a href="#">.jar</a>
Resource adapter	<a href="#">J2EE</a>	<b>ra.XML</b>	<a href="#">.rar</a>
Enterprise application	<a href="#">J2EE</a>	<b>application.XML</b>	<a href="#">.ear</a>
Client application	<a href="#">J2EE</a>	<b>application-client.XML</b>	

In the J2EE environment, packaging and deployment is done using a Java archive file. A Java archive file is a self-contained module that contains all of an application's Java class files, static files, and deployment descriptor files. Java archive files are created using a jar utility.

The format for a [deployment descriptor](#) is defined in both the [EJB](#) specification and the [servlet](#) specification. The Sun standards are defined at the following locations:

**J2EE environment applications** <http://java.sun.com/products/ejb/docs.html>

**Non-J2EE or standard web applications** <http://java.sun.com/products/servlet/download.html>

**Note:** Some vendors have extensions to these guidelines or have specific descriptors for their products. Refer to the vendor's site for these details. For example, the WebLogic BEA [Application Server](#) descriptors are available at [http://e-docs.bea.com/wls/docs70/webapp/WebLogic\\_XML.html](http://e-docs.bea.com/wls/docs70/webapp/WebLogic_XML.html).

## Guidance

- Document the use of non-J2EE-defined [deployment descriptors](#). [G1078]
- [J2EE](#) applications should isolate tailorable data values into the [deployment descriptor](#). [G1079]
  - Define all external resources by using a separate **resource-ref** element for each resource. [G1200]
  - Define configuration data such as [environment variables](#), parameters, and properties by using **resource-env-ref** elements. [G1201]

## Best Practices

- When [deploying](#) a new application to a WebLogic [application server](#) (e.g., [ear](#), [war](#) [rar](#)), do not edit the WebLogic startup file to add application-specific information. This file is used for [server](#) startup only and should not contain application-specific logic. The system administrator must approve and coordinate all updates to this file. [BP1076]
- Do not edit the config.xml file manually. The config.xml file is the persistent store used by the WebLogic server to store runtime configuration parameters. Instead, use the WebLogic management console to configure the WebLogic [server](#). Any edits done through the management console will be written to config.xml. [BP1077]

## Examples

### *Environment entries*

[Enterprise JavaBeans \(EJB\) environment values](#) are defined in the [deployment descriptor](#) using the **env-entry** element. Use [J2EE](#) provider utilities to modify these values during or after [deployment](#).

```
<env-entry>
  <env-entry-name>minQueueBuffer</env-entry-name>
  <env-entry-type>java.lang.Integer</env-entry-type>
  <env-entry-value>12</env-entry-value>
</env-entry>
<env-entry>
  <env-entry-name>maxQueueBuffer</env-entry-name>
  <env-entry-type>java.lang.Integer</env-entry-type>
```

```
<env-entry-value>120</env-entry-value>
</env-entry>
```

A bean can access the environment entries with a similar code to the following:

```
InitialContext initialContext
    = new InitialContext();
Context myenv
    = initialContext.lookup
      ( "java:comp/env" );
Integer minQueueBuffer
    = (Integer) myenv.lookup("minQueueBuffer ");
Integer maxQueueBuffer
    = (Integer) myenv.lookup("maxQueueBuffer ");
. . .
```

---

## Resource references

Use resource references to define and use environment entries. By default, the initial [J2EE](#) environment context is `java:comp/env/`. Consequently, it is best to classify all resources into subcontexts of the default. For example, classify all [JDBC](#) definitions using the default context with a [JDBC](#) subcontext appended to it. For example:

```
java:comp/env/jdbc
In the standard deployment descriptor, the declaration of a resource reference to a
JDBC connection factory is:
<resource-ref>
  <res-ref-name>jdbc/JTMS</res-ref-name>
  <res-type>javax.sql.DataSource</res-type>
  <res-auth>Container</res-auth>
</resource-ref>
```

And the [EJB](#) accesses the data source as in the following:

```
InitialContext initialContext
    = new InitialContext();
DataSource dataSource
    = initialContext.lookup
      ( "java:comp/env/jdbc/JTMS" );
```

---

## Resource Environment References

- The **resource-env-ref** describes administered objects, as opposed to objects that are better maintained programmatically. Administered objects help define objects that are likely to change between implementations: for example, [JMS](#) or database implementations. It is best to administer these objects along with other administrative tasks that vary from provider to provider and not within the application. This makes the code more portable.

```
<resource-env-ref>
  <resource-env-ref-name>jms/ConnectionFactory</resource-env-ref-name>
  <resource-env-ref-type>javax.jms.Queue</resource-env-ref-type>
</resource-env-ref>
```

The code to access the administered object follows:

```
InitialContext initialContext
    = new InitialContext();
ConnectionFactory connectionFactory = (ConnectionFactory)
    ctx.lookup("jms/ConnectionFactory");
```

## Example Deployment Descriptors

### ejb-jar.xml

```
<ejb-jar>
  <enterprise-beans>
    <session>
      <ejb-name>TestClient</ejb-name>
      <home>TestClientHome</home>
      <remote>TestClient</remote>
      <ejb-class>MyLogicBean</ejb-class>
      <session-type>Stateless</session-type>
      <transaction-type>Container</transaction-type>
    </session>
  </enterprise-beans>
  .
  .
  .
</ejb-jar>
```

### web.xml

```
/* Descriptor for Application named: HelloWorld.jsp */
MyWebApp/ (public directory)
  HelloWorld.jsp
WEB-INF/
  Web.XML
  Classes/myBean
<?XML version="1.0" encoding="UTF-8"?>
<web-app>
  <display-name>HelloWorldJSP</display-name>
  <servlet>
    <servlet-name>HelloWorld</servlet-name>
    <display-name>HelloWorld</display-name>
    <jsp-file>/HelloWorld.jsp</jsp-file>
  </servlet>
  <session-config>
    <session-timeout>30</session-timeout>
  </session-config>
  <ejb-ref>
    <ejb-ref-name>ejb/helloejb</ejb-ref-name>
    <ejb-ref-type>Session</ejb-ref-type>
    <home>HelloHome</home>
    <remote>Hello</remote>
  </ejb-ref>
</web-app>
Contact.class
```

## References

- J2EE - <http://java.sun.com/J2EE/>
- EJB - <http://java.sun.com/products/ejb/>
- .jar - <http://java.sun.com/developer/Books/javaprogramming/JAR/>
- .war - <http://access1.sun.com/techarticles/simple.WAR.html>
- .ear - [http://java.sun.com/J2EE/tutorial/1\\_3-fcs/doc/Overview4.html](http://java.sun.com/J2EE/tutorial/1_3-fcs/doc/Overview4.html)
- .rar - [http://java.sun.com/J2EE/tutorial/1\\_3-fcs/doc/Connector2.html](http://java.sun.com/J2EE/tutorial/1_3-fcs/doc/Connector2.html)

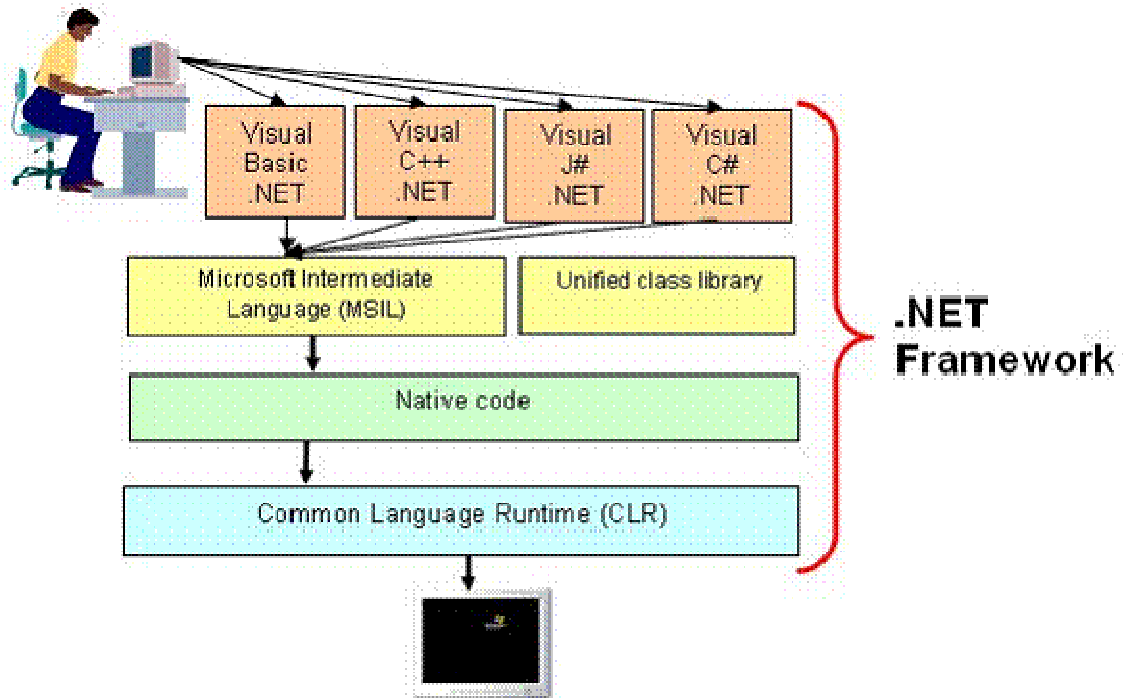
## *.NET Framework*

To address the confusing maze of computer languages, libraries, tools, and toolkits that were necessary for creating multi-tier applications, Microsoft developed the [.NET](#) Framework and integrated it into Microsoft Windows as a [component](#). It supports building and running multi-tier and Service Oriented Architectures (SOAs), including [web services](#) and [client](#) and [server](#) applications. It simplifies the process of designing, developing, and testing software, allowing individual developers to focus on core, application-specific code.

Microsoft summarizes the [.NET](#) Framework as:

- A consistent, language-neutral, [object-oriented programming](#) environment.
- A code-execution environment that minimizes software deployment and versioning conflicts, guarantees safe execution of code, and eliminates the performance problems of scripted or interpreted environments.
- A consistent development environment.
- A framework composed of two key parts: the [Common Language Runtime \(CLR\)](#) and the [Unified Class Libraries](#).

In the Microsoft [.NET](#) development environment, a programmer writes software in any one of several Visual [.NET](#) languages. These use a single, unified, object-oriented, hierarchical, and extensible set of class libraries to access the system and common services such as [XML web services](#), enterprise services, ADO.NET, and [XML](#). Next, the language source code is compiled into an intermediate [Microsoft Intermediate Language \(MSIL\)](#), which is later translated into platform-specific native code that uses the [CLR](#).



## Guidance

- Use [web services](#) to bridge [J2EE](#) and [.NET](#). [[G1101](#)]

## Best Practices

- Use the **System.Text.StringBuilder** class for repetitive string modifications such as appending, removing, replacing, or inserting characters. [\[BP1097\]](#)
- Write all [.NET](#) code in C#. [\[BP1098\]](#)
- Compile all code using the [.NET Just-In-Time compiler](#). [\[BP1100\]](#)

## References

For more information, see the [Microsoft Programming Languages](#) white paper on MSDN, written by Prashant Sridharan.

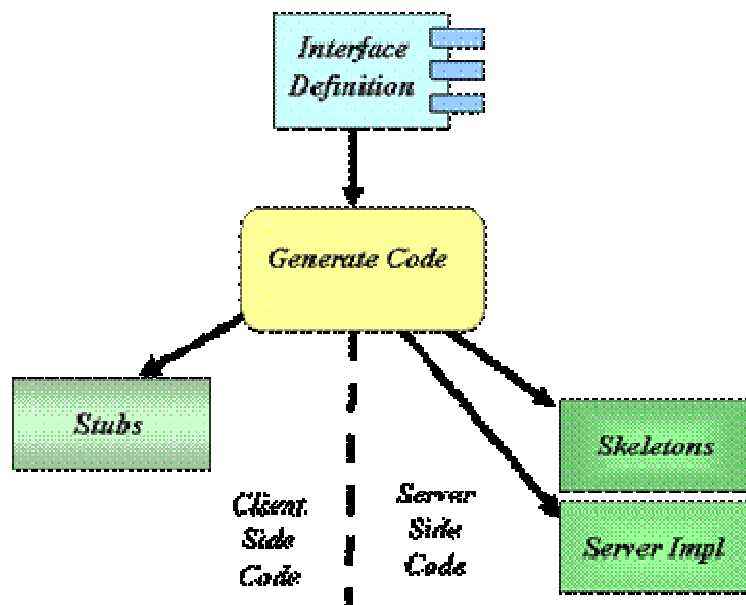


## CORBA

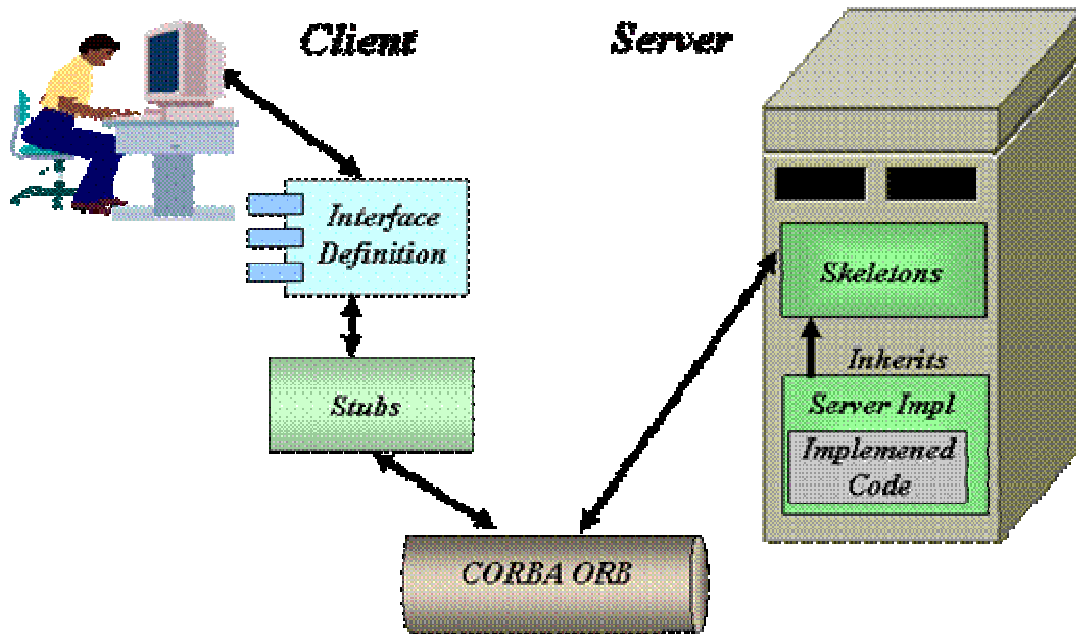
CORBA is the acronym for Common Object Request Broker Architecture. It is Object Management Group (OMGs) open, vendor-independent architecture and infrastructure that computer applications use to work together over networks. Using the standard protocol IIOP, a CORBA-based program from any vendor, on almost any computer, operating system, programming language, or network, can interoperate with a CORBA-based program from the same or another vendor, on almost any other computer, operating system, programming language, or network.

In general, the code that needs to be created to access an object remotely using CORBA can be implemented using well established and well understood design patterns. Consequently, it is not difficult to write but it is tedious and subject to human error during the writing process because much of it is of a cut-and-paste nature. Therefore, most Object Request Broker (ORB) vendors have developed code generators that can auto-generate the required infrastructure code given the definition of the interface between a client and a server. The use of these auto-generators is strongly encouraged.

The following diagram illustrates auto-generation of the infrastructure code from an interface defined using the CORBA Interface Definition Language (IDL).



This diagram illustrates how the generated code is used within the CORBA infrastructure.



## Key features

Some of the key features of interest in the [CORBA](#) specifications are:

- Internet InterORB [Protocol](#) (IIOP)
- Dynamic Invocation Interface (DII)
- Dynamic Skeleton Interface (DSI)
- Interface Repository (IFR)
- Objects by Value (OBV)
- [CORBA](#) Component Model (CCM)
- Portable Object Adapter (POA)
- General InterORB [Protocol](#) (GIOP)
- [Java](#) to [IDL](#) mapping

## Guidance

- Localize [CORBA](#) vendor-specific source code into separate modules. [\[G1118\]](#)
  - Use the [CORBA Portable Object Adapter](#) (POA) instead of the [Basic Object Adapter](#) (BOA). [\[G1202\]](#)
- Isolate user-modifiable configuration parameters from the [CORBA](#) application source code. [\[G1119\]](#)
  - Create configuration services to provide distributed user control of the appropriate configuration parameters. [\[G1204\]](#)

- Use non-source code persistence to store all user-modifiable [CORBA](#) service configuration parameters. [\[G1205\]](#)
- Do not modify [CORBA IDL](#) compiler auto-generated stubs and skeletons. [\[G1121\]](#)
- Use the “Fat Operation Technique” in [IDL](#) operator invocation. [\[G1123\]](#)

## Best Practices

- When using [CORBA](#) strings, follow the best-practice guidelines in the documents listed below. [\[BP1122\]](#)
  - Use **CORBA::String\_var** in [IDL](#) to pass string types in C++. [\[BP1231\]](#)
    - Do not pass or return a zero or null pointer. Instead, pass an empty string. [\[BP1232\]](#)
    - Do not assign **CORBA::String\_var** type to INOUT method parameters. [\[BP1233\]](#)
    - Assign string values to OUT, INOUT, or RETURN parameters using operations to allocate or duplicate values, rather than creating and deleting values. [\[BP1234\]](#)
    - Assign string values to returned-as-attribute values using operations to allocate or duplicate values, rather than creating and deleting values. [\[BP1235\]](#)

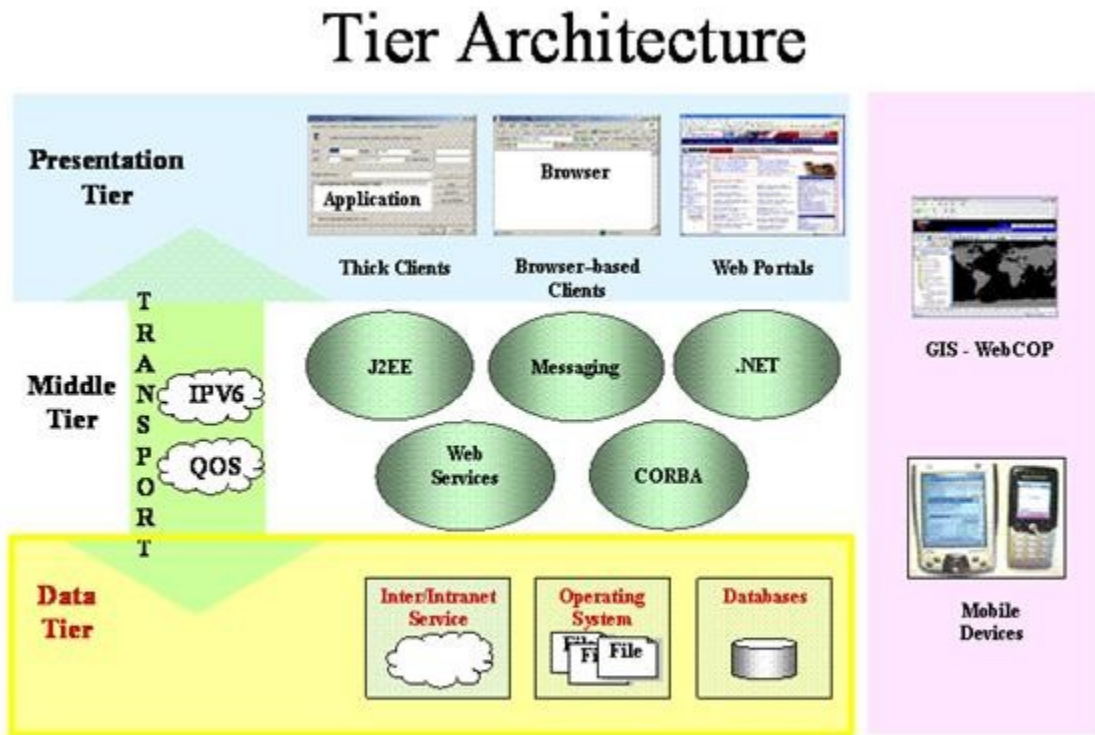
## References

- OMG - <http://www.omg.org/gettingstarted/gettingstartedindex.htm>

## Data Tier

### *Data Tier*

The data tier is responsible for storing data. It does not (should not) contain any business logic, and handles only that processing required to access data and maintain its integrity.



Future guidance will include:

- **Database topics:** Lessons learned from Oracle and Sybase, [replication](#) across database vendors, and database federation concepts.
- **Design patterns and examples:** Recommended patterns and implementations.
- **Security guidelines:** Authentication schemes, secure coding practices, digital certificates, digital signatures, firewall policies, protection mechanisms, and [SSL](#).
- **XML:** Coding guidelines, namespaces, XML parser usage, wrapper classes, XML databases, and XML security guidelines like [SAML](#).

**Note:** That this guidance may be moved to other sections of the [NESI](#) documentation, as appropriate.

Most modern multi-tiered systems need to collect, store, retrieve and manage persistent data. This data persistence is the responsibility of the data tier. In essence, the data tier functionality is accomplished with modern [COTS](#) Database Management Systems ([DBMSs](#)) such as MySQL, Oracle, [SQL](#) Server, or Sybase Adaptive Server Enterprise (ASE).

## ***Decouple from Applications***

To promote database independence, access the database only through [open-standards](#) interfaces. The goal is to swap out data sources and/or connect to multiple data sources without affecting the application or increasing software maintenance costs. Data-level adapters allow applications to access data through database calls that are native to the requesting application. At this point, the [business logic](#) can be shared with other data sources. This positions the application to move business logic from the database to the middle tier, to support database independence.

## **Guidance**

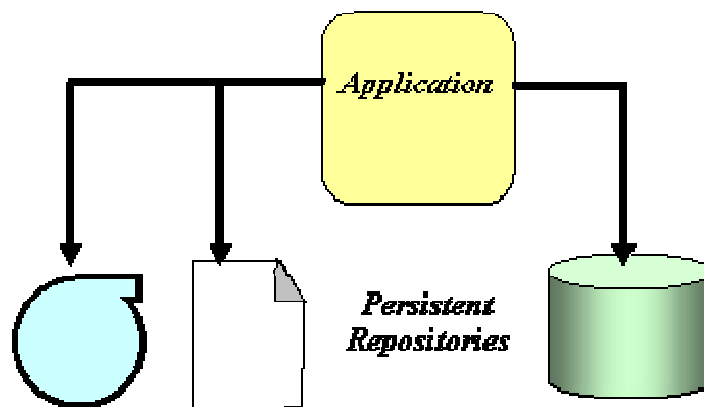
- Access the database only through [open-standards](#) interfaces to promote database independence. [\[G1014\]](#)
- For Java, use [JDBC](#). [\[G1211\]](#)
- For C/C++ and [.NET](#) use [ODBC](#). [\[G1212\]](#)

## Database Implementations

The data tier is simply a repository for persistent data. There are many ways that data can be persisted:

- [OS File Systems](#)
- [Hierarchical Databases](#)
- [Object-oriented Databases](#)
- [Niche Databases](#)
- [Native XML Databases](#)
- [Relational Databases](#)

[COTS DBMS](#) are mature technical products, the capabilities of which are being continually expanded to adapt to and accommodate new technologies.



## Guidance

- Implement the data tier using readily available [COTS DBMS](#) products that implement the [SQL](#) standard and provide a rich set of generic capabilities such as row-level locking, [stored procedures](#), [triggers](#), and a high-level language [API](#) interface. [G1132]

## ***Database Development***

The end products of [data modeling](#) can be [XML](#) schemas or RDBMS schema definitions. See the Data Modeling section. The following guidance applies to the data modeling phase of the data tier.

### **Guidance**

- Use standard [data models](#) developed by [Communities of Interest \(COI\)](#) as the basis of program or project [data models](#). [G1141]
- Develop a two-level database models: one level captures the [conceptual](#) or logical aspects, and the other level captures the [physical](#) aspects. [G1144]
- The [data models](#) should contain information necessary to generate a [data dictionary](#). [G1146]
- [Domain analysis](#) should define the constraints on input data validation. [G1147]
- Normalize the [data models](#). [G1148]

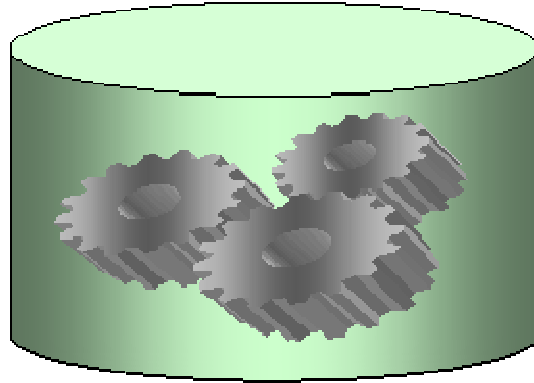
### **Best Practices**

- Use a [database modeling](#) tool that supports a two-level model ([Conceptual/Logical](#) and [Physical](#)) and [ISO-11179](#) data exchange standards. [BP1143]
- [Conceptual and logical models](#) should be vendor-neutral whenever possible. [BP1145]
- For command-and-control systems, use the names defined in the [C2IEDM](#) for data exposed to the outside communities. [BP1254]
- Use [surrogate keys](#). [BP1255]
- Use surrogate keys as the [primary key](#). [BP1256]



## ***RDBMS Internals***

A [RDBMS](#) is a collection of data items organized as a set of formally-described tables. You can access and reassemble data in many different ways without having to reorganize the database tables. It is important to ensure data quality and to access data quickly, using simple, easily understood dynamic queries. Towards these ends, an [RDBMS](#) offers such services as [triggers](#), [stored procedures](#), indices, constraints, [referential integrity](#), efficient storage, and [high availability](#) features.



## **Guidance**

- Define declarative [foreign keys](#) for all relationships between tables to enforce [referential integrity](#). [\[G1151\]](#)
- Use [stored procedures](#) for operations that are focused on the insertion and maintenance of data. [\[G1154\]](#)
- Use [triggers](#) to enforce [referential](#) or [data integrity](#), not to perform complex [business logic](#). [\[G1155\]](#)

## **Best practices**

- Follow a naming convention: [\[BP1248\]](#)
- Do not use generic names for database objects such as databases, schema, users, tables, views, or indices. [\[BP1249\]](#)
- Use case-insensitive names for database objects such as databases, schema, users, tables, views, and indices. [\[BP1250\]](#)
- Separate words with underscores. [\[BP1251\]](#)
- Do not use names with more than 30 characters. [\[BP1252\]](#)
- Do not use the [SQL:1999](#) or SQL:2003 reserved words as names for database objects such as databases, schema, users, tables, views, or indices. [\[BP1253\]](#)
- For [command-and-control](#) systems, use the names defined in the [C2IEDM](#) for data exposed to the outside communities. [\[BP1254\]](#)

- Use [surrogate keys](#). [BP1255]
- Use surrogate keys as the [primary key](#). [BP1256]
- Place a [unique key constraint](#) on the [natural key](#) fields. [BP1257]
- All data that are transferred using [XML](#) should explicitly define the encoding style. [BP1258]
- Use indexes. [BP1259]
- All tables should have a [primary key](#) defined. This is generally enforced via an underlying index. [BP1260]
- Monitor and tune indexes according to the response time during normal operations in the production environment. [BP1261]
- In the case of Oracle, define indexes against the [foreign keys \(FK\)](#) columns to avoid contention and locking issues. [BP1262]
- Gather storage requirements in the planning phase, and then allocate twice the estimated storage space. [BP1263]
- For [high availability](#), use hardware solutions when geographic proximity permits. [BP1264]

**Software Computing Resources**

*Software Computing Resources*

## Security

### Security

In the day's post 911, security has taken top priority in our nation's agenda. The terrorist has made America painfully aware of the consequences of inadequate security. As a result, billions of dollars along with numerous resources have been allocated to homeland security. For this very reason, it is more critical than ever to establish security guidelines for new and evolving Military applications.

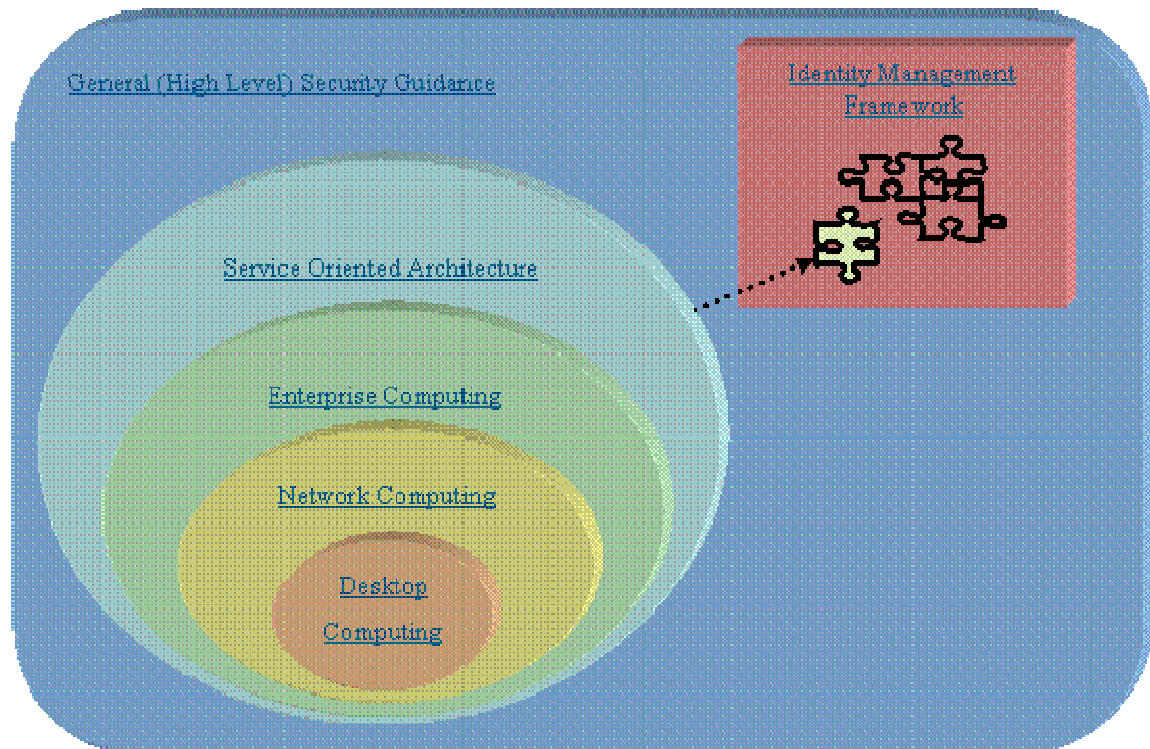
In general, there exist two aspects to security that must be considered for any application. The obvious one is the application itself; the other is security of the application deployment platform. To simplify things, NESI guidance will only address application security concerns and not concerns related to the application deployment platforms. It would be a monumental task if not impossible to cover security for the varieties of operating systems, application servers, database servers, etc... Therefore our focus will remain with providing application security guidance.

Security is an enormous topic and one that is pervasive throughout all application models. Even though it would be convenient to have a single document that will cover all security concerns, it simply is not possible. Security is an evolving process that should evolve with the application lifecycle. The approach of this document then is to first cover general security guidance that will be applicable to all application types. After covering the general security guidance, this document will cover guidance that is specific to an application type. The coverage will be one of increasing application scale, starting with Desktop applications and finish up with a look at how future net-centric application will integrate and interoperate with the DoD's Identity Management Framework.

Application Scales:

- [Desktop Computing](#)
- [Network Computing](#)
- [Enterprise Computing](#)
- [Service Oriented Architecture](#)
- [General High Level Guidances](#)

In summary, the security guidance provided will be applicable to applications at any stage of the development lifecycle. However, even if a software application adheres to all recommended guidance, there are no guarantees that the application will be secure. It would be foolish to think that all application security concern can be addressed in one chapter of the NESI Developers Guide. At best security is a moving target and an evolving process. In fact, a cottage industry of software applications grew out of the fact that software can not be trusted. As grim as it sounds, it does not mean that secure software is unachievable. Software can be designed and developed in such a way that it would be virtually impossible for attackers using current day resources. Following and applying NESI's recommended guidelines can be a good first step toward securing an application. To ensure the integrity of software application throughout its lifecycle, software reviews and compliance reviews must be performed as part of the ongoing application evolutionary process.



**Figure 1 Application Security Coverage**

## General High Level Guidance

### *General Application*

This section provides high level guidance for all application types. The goal of the guidance in this section is to shore up the gaps of all the application specific guidance in sections to follow. Some of the guidance in this section may not appear to be directly related to security, however, these guidance are important in ensuring the quality of code to prevent attackers from taking advantage of coding mistakes. Keep in mind there are no silver bullets with software security, all aspects of an application must be scrutinize and tested to ensure the user and the application are protected.

### Guidance

- Secure all [endpoints](#). [G1300]
- Practice layer security. [G1301]
- Validate all inputs. [G1302]
- Audit errant behavior, application violations and use of application cryptographic features.  
[G1303]
- Unit Test all code. [G1304]
- Ensure the separation of [encrypted](#) and unencrypted information. [G1305]
- [Identify](#) and [authenticate](#) users of the application. [G1306]
- Provide a security policy file. [G1307]

## Public Key Infrastructure (PKI) and PK Enable Applications

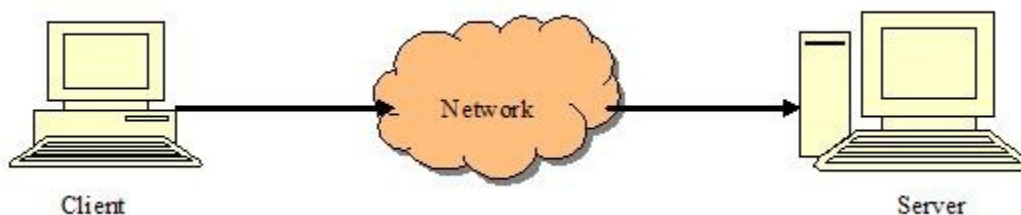
More and more secure [client/server](#) applications are appearing on the market. [Digital Signature](#) technology, which is used to certify messages received were indeed sent by the sender, is also being heavily used in applications today. Both of these technologies use [Public Key encryption](#), which is currently the only feasible way of implementing security over an insecure network such as the [NIPRNET](#). [Public Key encryption](#) ensures that any form of communication that many contain sensitive information (passwords, credit cards) is protected while in transit and to assure the receiver that the message was really sent by the sender. In the case of web based technologies, this is accomplished with a server that implements [encryption](#) at the communications level. The de facto standard for communication base [encryption](#) is the [Secure Sockets Layer \(SSL\)](#). The [infrastructure](#) used to support communication based [encryption](#) is [PKI](#). [PKI](#) is composed of a number of cryptographic technologies but provides for two key services, data integrity and confidentiality. [Public Key](#) systems ([PKI](#)) involve a [Certification Authority \(CA\)](#) responsible for issuing a pair of [encryption](#) keys; one public and one private. [PKI](#) systems typically rely upon the ability of the system to protect the [private key](#) from all but the intended user. If the [private key](#) can be copied or made public, then the authenticity of the transactions with the associated [Public Key](#) can not be trusted. A [CA](#) creates, signs, and issues [Public Key Certificates](#). The [CA](#) also posts [Certificate](#) information to the directory and maintains a [CRL](#).

[CAs](#) creates [Public Key Certificates](#) by interacting directly with users in the case of software [Certificates](#), or by interacting with the [NESI](#) workstation via the Issuance Portal for Common Access Cards (CACs). [CAs](#) receives [Public Keys](#) from users or the [NESI](#) workstation, add information about the user's [identity](#), and format all of it into a [Public Key Certificate](#). The [CAs](#) then signs the [Certificate](#). Consequently, the user can prove he or she is part of the [PKI](#) because the [CA](#) has signed his or her [Certificate](#), and the [CA](#) can prove it is part of the [PKI](#) because the root [CA](#) has signed its [Certificate](#).

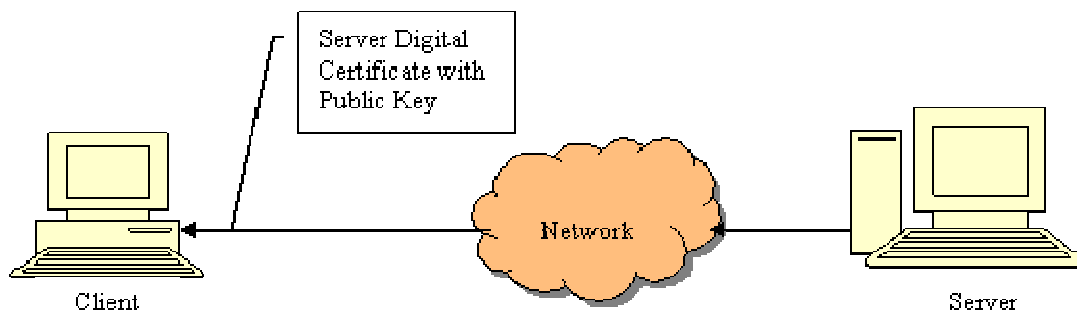
[Digital Certificates](#) are used to link a [Public Key](#) to an entity. The [Certificate](#) contains information about the issuer of the [Certificate](#), the owner of the [Certificate](#), the [Public Key](#) contained in the [Certificate](#) and a [Digital Signature](#). [Certificates](#) authenticates the [identity](#) of owner because the [Digital Signature](#) is a message digest of all the information in the [Certificate](#). If the information was tampered with, the [Digital Signature](#) would be different and would not be able to be verified by the [Certificate authority](#).

To guarantee that data stays confidential and secure from attackers listening on the network in promiscuous mode (network sniffers), [Symmetric Encryption](#) (single key) is used to encrypt and decrypt the data. [Asymmetric Encryption](#) ([Public Key](#) - [private key](#)) is not used for all [encryption](#) because it too expensive for high volume data. For [SSL](#), [Asymmetric Encryption](#) is used initially to pass the [secret key](#) (often called the [session key](#)). Once the secret key has been established on both sides, all subsequent data communications can be performed using [Symmetric Encryption](#). The entire [SSL](#) communications process is described as follows:

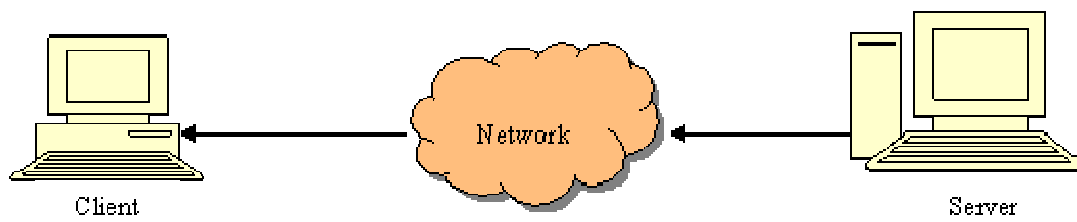
**Step 1:** Client Request - client sends the server a “hello” [message](#).



**Step 2:** Server Response – Server sends client its cert (including server’s [Public Key](#)) as part of “hello” message.

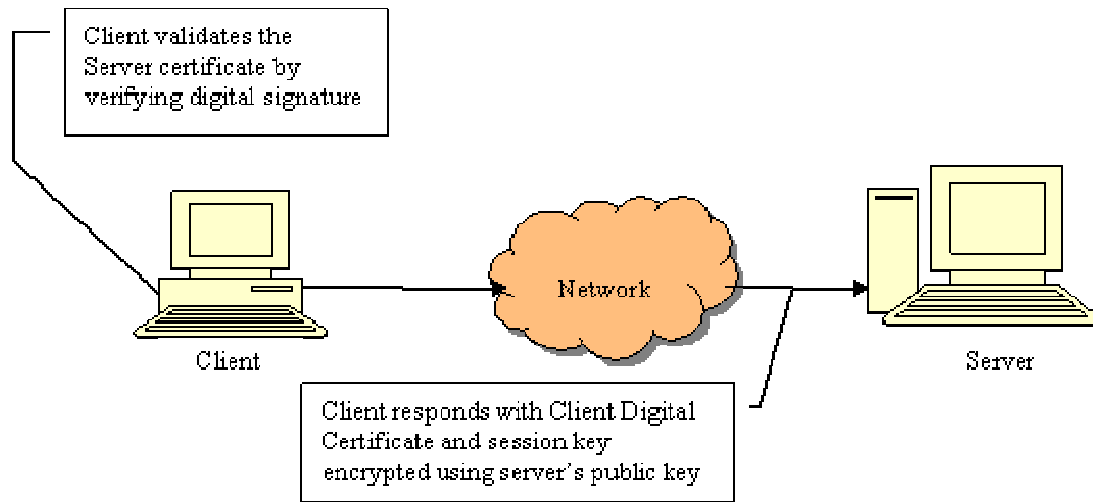


**Step 3:** Server Request Client [Certificate](#) (this is an optional step).

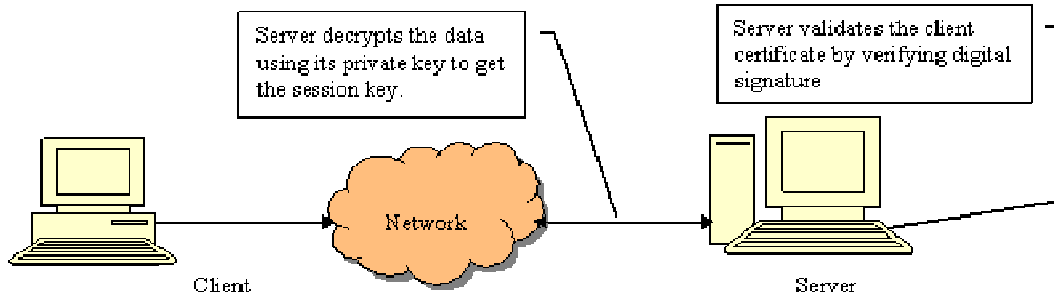




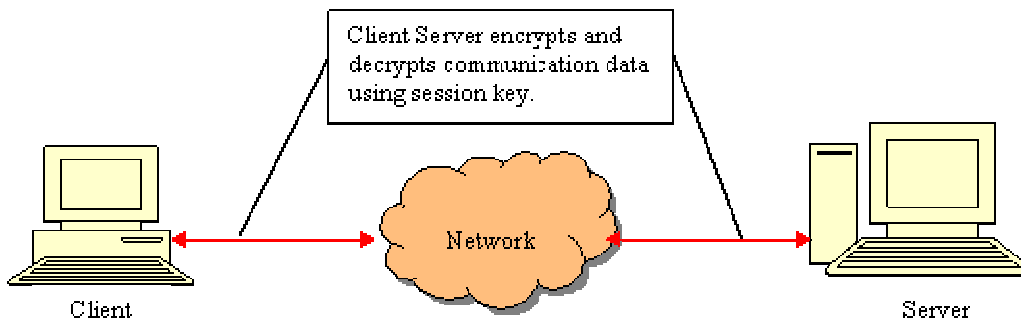
**Step 4:** Client validates server [Certificate](#) and replies with creation of session key and sends it encrypted using server's [Public Key](#).



**Step 5:** Server decrypt data to obtain [Session Key](#).



**Step 6:** Client Server communicates securely using [Symmetric Encryption](#) with the [Session Key](#). [SSL](#) channel is now established.



You really have two options when you're an application needing to support [PKI/SSL](#). You can use a module that have been approved by [JITC](#) or develop your application abiding by the [DoD Class 3 Public Key Infrastructure Interface Specification](#). The following guidances applies to [Public Key Enabled](#) applications wanting to operate within the DoD [PKI](#).

## Guidance

- Applications handling unclassified medium value information in Moderately Protected Environments, unclassified high value information in Highly Protected Environments, and discretionary access control of classified information in Highly Protected Environments shall be [Public Key Enabled](#) to interoperate with DoD [Class 3 PKI](#). [G1308]
- Applications handling high value unclassified information in Minimally Protected environments must be [Public Key Enabled](#) to interoperate with DoD [Class 4 PKI](#). [G1309]
- Applications shall protect cryptographic objects and functions from tampering. [G1310]
- Applications must use [LDAP](#), [HTTP](#), or [HTTPS](#) when communicating with DoD [PKI](#). [G1311]
- Application must be capable of being configured for use with the DoD [PKI](#). (4.4) [G1312]
- Application must provide documentation for configuration and setup for use with the DoD [PKI](#). [G1313]

## ***Key Management***

The key enabler in the [PKE](#) applications is [Asymmetric Encryption](#), or rather the use of public and [private keys](#). It is used in exchanging session keys, and it is used to verify [Certificates](#), therefore it is critical for applications to manage and protect the keys used in [PKI](#). This includes the associated technologies used to store the keys and [Certificates](#). The following list of guidance addresses key management issues:

### **Guidance**

- The application shall have the ability to import and export keys (provided it's not stored on hardware token). [\[G1314\]](#)
- Applications shall use key pairs and [Certificates](#) created for individuals using DoD [PKI](#) methods and procedures defined by the [DoD Class 3 Public Key Infrastructure Interface Specification](#), Draft Specification, 13 January 2000 and the *Personal Information Exchange Syntax Standard*. [\[G1315\]](#)
- Applications shall protect [private keys](#). [\[G1316\]](#)
- Applications shall store [Certificates](#) for subscribers (the owner of the [Public Key](#) contained in the [Certificate](#)). [\[G1317\]](#)
- Applications shall provide capability to manage and store [trust points](#) ([Certificate Authority Public Key Certificates](#)). [\[G1318\]](#)
- Application shall be able to recover data (key provided by the DoD [PKI KRM](#)). [\[G1319\]](#)

## *Encryption Services*

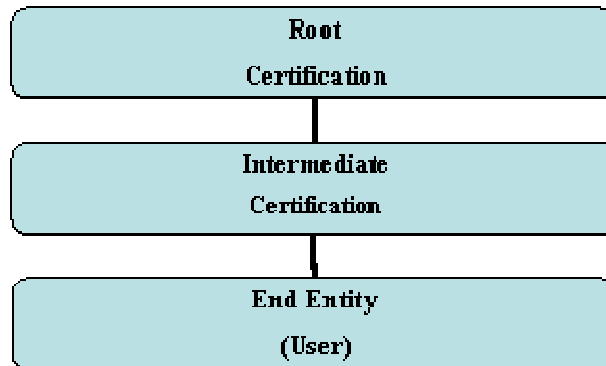
Successful implementation of [Public Key](#) enable applications is predicated on the correct selection and use of security algorithms. This section provides guidance on the use of [encryption](#), [Digital Signature](#), and authentication services in a consistent manner to interoperate within DoD's [PKI](#).

### Guidance

- Applications shall use 128 bit [symmetric keys](#), 1024 bit [asymmetric keys](#). [G1320]
- Applications shall be capable of performing [Public Key](#) operations necessary to verify signatures on DoD [PKI](#) signed objects (viz., [Certificates](#), [CRLs](#), and [OCSP](#)). [G1321]
- Applications that interact with the DoD [PKI](#) using [SSL](#) (i.e., [HTTPS](#)) must be capable of encrypting and decrypting data using the [Triple Data Encryption Algorithm \(TDEA\)](#). [G1322]
- Applications using [Symmetric Encryption](#) must be capable of generating random [Symmetric Encryption](#) keys. [G1323]
- Applications shall protect [symmetric keys](#) for the life of their use. [G1324]
- Applications shall encrypt [symmetric keys](#) when not in use. [G1325]
- Applications shall be capable of producing [SHA](#) digests of [messages](#) to support verification of DoD [PKI](#) signed objects. [G1326]

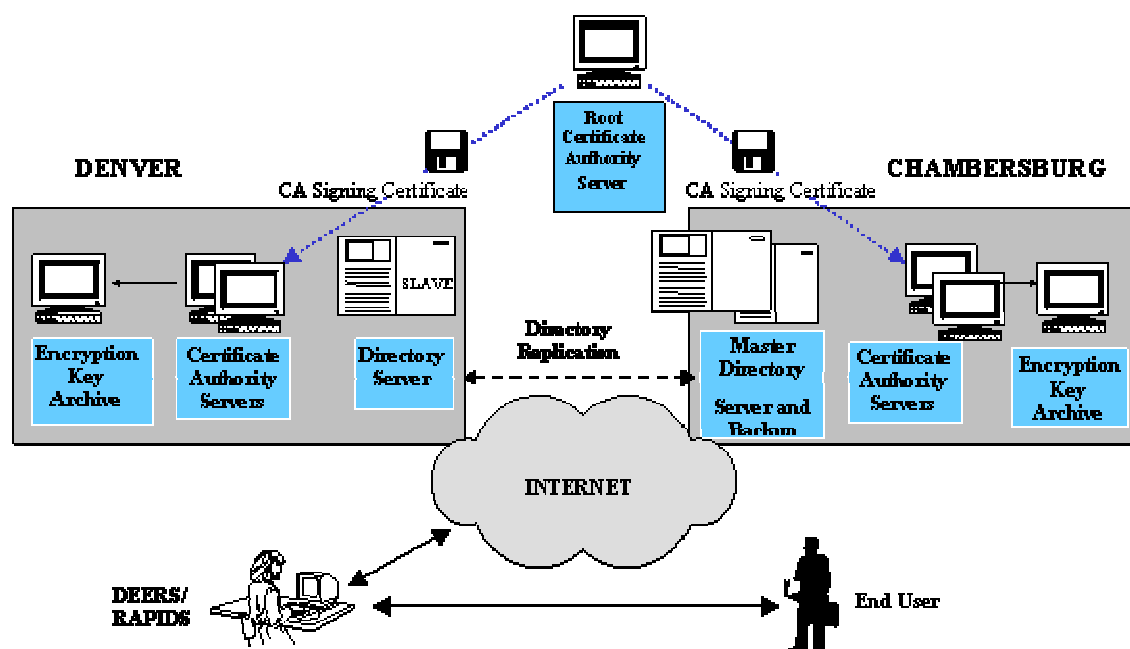
## Certificate Processing

The DoD's implementation of the [Public Key Infrastructure \(PKI\)](#) is the framework and services that provide for the generation, distribution, control, tracking and destruction of [Public Key Certificates](#). The purpose of a [PKI](#) is to manage keys and [Certificates](#) in a way where by the DoD can maintain a *trustworthy networking environment*. Digital [Certificates](#) are issued by DoD's [Certificate Authority](#). It is an electronic document that contains user's [identity](#), a public key, a validity period, and the issuing authority. It is digitally signed and the [Certificate](#) is chained hierarchically in a path that can be traced to the Root [Certificate](#).



**Certification Authority Hierarchy**

[Certificates](#) can be sent via email or more commonly retrieved from repositories ([Directory Server](#)). Applications must validate the [Certificate](#) by checking status of the [Certificate](#). There are two forms of status checking, the legacy [Certificate Revocation List \(CRL\)](#) or [Online Certificate Status Protocol \(OCSP\)](#). The status check determines whether a [Certificate](#) is revoked. [Certificate](#) can be revoked if the information in the [Certificate](#) may have changed (relocation, new email), or the [Certificate](#) has been compromised. The [Certificate](#) validation is a critical part of the [PKI](#) process; it is the application's responsibility to perform the status checks. The following guidance sets the guidelines for the [Certificate](#) processing.



## Certificate Authority Architecture

### Guidance

- The application shall be able to request and obtain new [Certificates](#) for subscribers. [\[G1327\]](#)

- The application shall be able to retrieve [Certificates](#) and use them in relying party operations. [\[G1328\]](#)
- Application shall be able to check [Certificate](#) status. [\[G1329\]](#)
- Application shall be able to perform status checking using retrieve [Certificate Revocation List \(CRL\)](#) or [Online Certificate Status Protocol \(OCSP\)](#). [\[G1330\]](#)
- Application shall be able to retrieve [Certificates](#) and [CRL](#) from archive (directory service). [\[G1331\]](#)
- [Certificate](#) signatures shall be verified using the [Certificate](#) issuer's [Public Key](#). [\[G1332\]](#)
- [Certificate](#)'s effective date shall fall within the [Certificate](#)'s validity period. [\[G1333\]](#)
- Applications shall ensure that the intended use of the [Certificate](#) is consistent with the extensions. [\[G1334\]](#)
- Applications shall be capable of being configured to operate with only DoD [PKI trust points](#). [\[G1335\]](#)
- The application shall demonstrate its ability to store DoD [PKI trust points](#). [\[G1336\]](#)
- Application shall be capable of path development and path processing. [\[G1337\]](#)
- Applications and [Certificates](#) need to be able to support multiple organizational units. [\[G1338\]](#)



## Desktop Computing

### *Application Programming Interface (API)*

## ***Application Programming Interface (API)***

At the very fundamental level, applications are composed of calls to various [API\(s\)](#) or [Component](#) libraries. [API](#) (s) and [Component](#) libraries should be developed to safeguard system resources and application's reliability. It is important secure [API](#) (s) and [Component](#) libraries because these are often reused in multiple applications. A mistake in security could open up multiple applications to attacks. The guidance that follows provides some general [API](#) guidance that is independent of language or platform. More language / platform specific guidance will follow the general [API](#) guidance.

### **Guidance**

- Practice defensive programming by checking all method arguments. [[G1339](#)]
- Log all exceptional error conditions. [[G1340](#)]

## Java

Java is an [Object Oriented Language](#). As an [Object Oriented Language](#), applications benefit from the encapsulation features which offers protection for application data. Java was also designed and built with security in mind. Some of the security features include: restricting direct access to memory (protecting data access privileges), array bounds checking (buffer overflow), and ability to install a security manager to protect system resources. Despite all the security features built into the Java Language, it does not mean that Java [API](#) (s) are immune to security problems. Care must still be taken in the design and implementation of the [API](#) (s) to prevent attacks. The following security guidance are targeted to Java specific [API](#) (s).

## Guidance

- Use a security manager support to restrict application access to privileged system resources. [\[G1341\]](#)
- Class internal variable access should be restricted to the class (private). [\[G1342\]](#)
- Declare classes final to stop inheritance and prevent methods from being overridden. [\[G1343\]](#)

## *Application Resource Security*

Application use and store lots of data that often do not go into databases. For instance, an application often use configuration files for application configuration, preferences files for personalization information (custom user experience) and resource files for internationalization support. Appropriate protection must be applied to sensitive resources to prevent attackers from tampering. Application bundles, properties files, configuration files when tampered could cause the user to execute inappropriate commands, expose sensitive data due to invalid configuration or cause the application to be inoperable. Therefore it is of utmost importance to take appropriate measures to protect these resources.

### Guidance

- Encrypt sensitive data stored in configuration or resource files. [\[G1344\]](#)
- Bundle read only resources as part of the software and [digitally signed](#) the software bundle to prevent tampering. [\[G1345\]](#)

## Network Computing

## Enterprise Computing

# Enterprise Computing

Enterprise computing existed long before the emergence [World Wide Web](#). The web simply facilitated extending the [Enterprise](#) to the World. The web provided a ubiquitous protocol ([HTTP](#)) and interface for accessing network resources. Securing an enterprise application however provides a number of challenges. First, by virtue of being a [Web Application](#), it means the application must support multiple simultaneous users. Second, an Enterprise [Web Application](#) usually consists of a number of moving parts ([Components](#)) on multiple computers. For instance, a [Web Application](#) typically employs tier architecture (presentation, business, and data) in which a complex group of servers and [Components](#) work together to generate a response to the user. We will address the security concerns in the same order. First, to address user management security, we need guidance that assures the user's trust in the [Web Application](#) and also ensure that the customer data is protected. [PKI Certificates](#) authenticates the Servers and Users through a [Certificate Authority](#). [HTTPS](#) ([HTTP](#) over [SSL](#)) ensure that communication data is encrypted. Second, to address tier application architecture security concerns, we must look at the security of the [Components](#) in each of the applications tiers. For presentation tier, we will look at security guidance in relations to user interaction (cross site scripting), form data processing and validating input. For Business Tier security guidance, we can take a look at declarative security through deployment descriptors, [JNDI](#) and programmatic security. For Data Tier security guidance, we must look at securing the user access to the Relational Database Management System ([RDBMS](#)). We must also provide guidance on the protocol ([SQL](#)) that databases process and the API ([JDBC](#) or [ODBC](#)) that provide database agnostic access to the data tier.

In general, [Component](#) security within an Enterprise presents less risk than [Components](#) that are available outside the Enterprise. We will cover [Cross Domain](#) system integration in the next section.

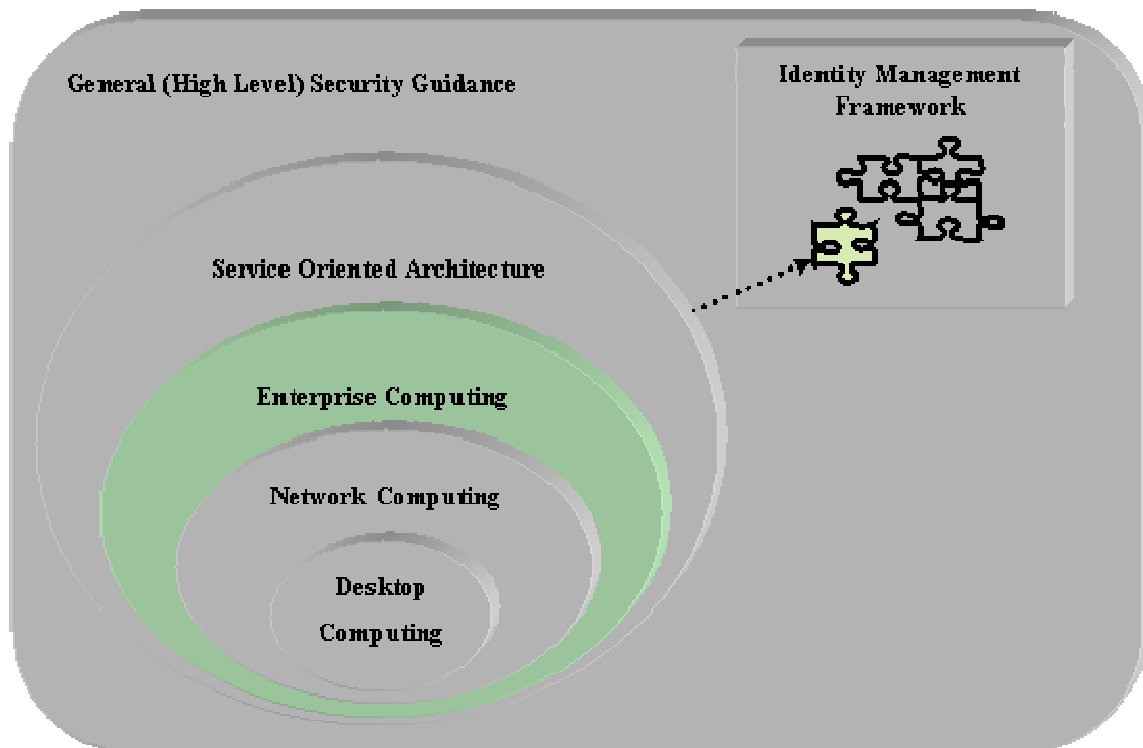
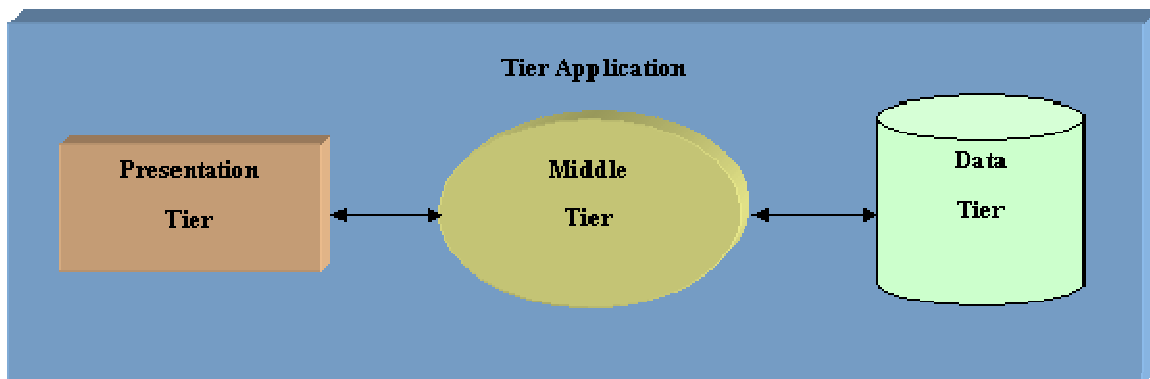


Figure 5 Enterprise Security Coverage

As we continue to address security concerns from the standpoint of an evolving software application, we can see that software requirements and software complexity will continue to grow. The complexities of today's enterprise software make it difficult to develop custom monolithic applications. Today's enterprise application must support multiple users using the application concurrently. It must be portable and interoperate with various standard and custom enterprise services through industry standard interfaces. To meet that demands, most enterprise application will rely on an architecture that is flexible, reusable, maintainable and interoperable. That application architecture model is the Tier Application architecture.

What is the Tier Application Architecture? Simply put, the Tiered Application Architecture takes an application and breaks it up into functional units, so call Tiers. A Tier is defined as a piece of software that provides part of the functionality for a complete application. The following diagram shows the general model of a three Tier application Architecture.



**Figure 9 Tier Application Model**

Even though an Enterprise Application can compose of N-Tiers, we will be using a general three tier model to address the security concerns for the Enterprise application. The Presentation Tier is typically used to display the user interface and the application data. The Middle Tier provides the application logic and how data should be validated and processed. The Data Tier provides permanent store for the application data. The benefits of this model are interoperability, lower cost of maintenance, and interchangeability. This section will address the security guidance in accordance to the generalized three tier architecture. Starting from the Data Tier, to the Middle tier and finally to the Presentation Tier. The coverage of each tier may involve more than one applicable technology or platform which will have additional perspective and guidance specific to the topic.

Future guidance will include:

**J2EE: JDBC**

**J2EE: JNDI**

**J2EE: Java Message Service (JMS)**

**J2EE: Enterprise Java Beans (EJB)**

**J2EE: Servlets**

**J2EE: JSP**

**Lightweight Directory Access Protocol (LDAP)**

**Middle Tier**

**Message Oriented Middleware (MOM)**

**.NET**

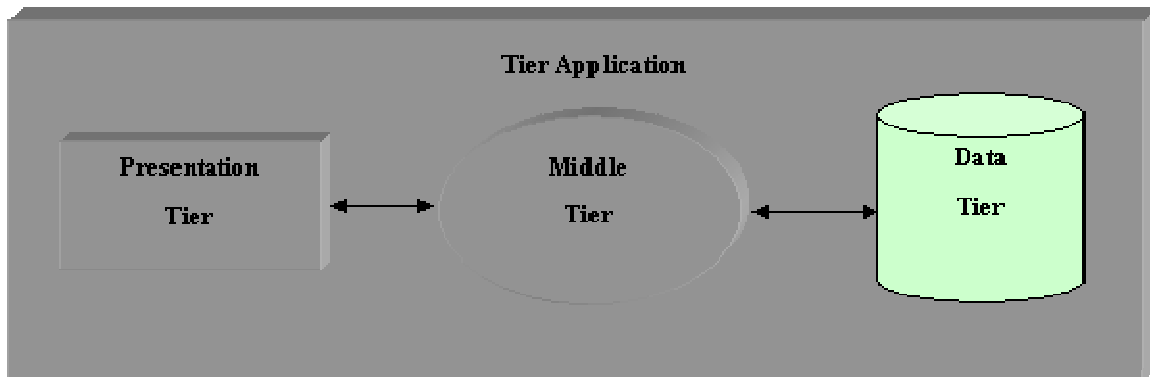
**ASP.NET**

**Presentation Tier**

**Mobile Code**





*Data Tier***Data Tier****Tier Application Model**

In general there are two mechanism used for persistent storage of data for applications, [Relational Database Management System \(RDBMS\)](#) and [Lightweight Directory Access Protocol \(LDAP\)](#) server. Other more primitive and or custom forms of persistent store exists but will not be covered by this section. In practice, custom formats are not portable and therefore not recommended. Acceptable forms such as properties files and [XML](#) files are covered by guidance [\[G1342\]](#) in the Desktop Application Section under Application resource security. The umbrella guidance [\[G1381\]](#) exists to cover all custom formats and solutions.

Typically, applications are insulated from direct access to the database. Instead industry standard abstract interfaces are used to access backend data stores. The benefit of this approach is that it decouples the application from database specific details and therefore allows interchangeable data store implementations. The security guidance for these standard [APIs](#) ([JDBC](#) for [RDBMS](#) and [JNDI](#) for [LDAP](#)) will be covered as part of the Data Tier is subsequent sections.

***Guidance***

- Encrypt all sensitive persistent data. [\[G1381\]](#)

## ***Relational Database Management Systems (RDBMS)***

[Relational Database Management Systems](#) remain on top amidst emerging technologies such as [XML](#) and [Object Oriented Database Management](#) system. [Relational Database](#)'s continue dominance is unlikely to change in the near future. First, there is still a large amount of legacy data and legacy applications that rely on [RDBMS](#). Second, [RDBMS](#) are continuing to evolve to integrate [XML](#) as a function of the database. [RDBMS](#) is a reliable and proven technology that will be here for the long run. Therefore this section will provide some guidance on how best to secure the database.

### ***Guidance***

- Audit database access. [[G1346](#)]
- Secure remote connections to database. [[G1347](#)]
- Log database [Transactions](#). [[G1348](#)]
- Validate all input that will be use as part of any dynamically generated [SQL](#). [[G1349](#)]
- Implement a strong password policy for [RDBMS](#). [[G1350](#)]
- Enhance Database security by using multiple user accounts with constraints. [[G1351](#)]
- Use database clustering and RAID for high availability of data. [[G1352](#)]
- Use read only, and write only databases for sensitive data. [[G1353](#)]
- Authenticate data using row or column level [Encryption](#). [[G1354](#)]

### ***Best Practices***

- Do not design the database around the requirements of an application. [[BP1355](#)]

## **Lightweight Directory Access Protocol (LDAP)**

[Lightweight Directory Access Protocol](#) can be thought of as a datastore. It is an open Internet standard produced by the [Internet Engineering Task Force](#) (IETF). [LDAP](#) is, like X.500, both an information model and a protocol for querying and manipulating it. [LDAP](#)'s overall data and namespace model is essentially that of X.500. The major difference is that the [LDAP](#) protocol itself is designed to run directly over the [TCP/IP](#) stack, and it lacks some of the more esoteric DAP protocol functions. [LDAP](#) can store text, photos, [URLs](#), pointers to whatever, binary data, and [Public Key Certificates](#).

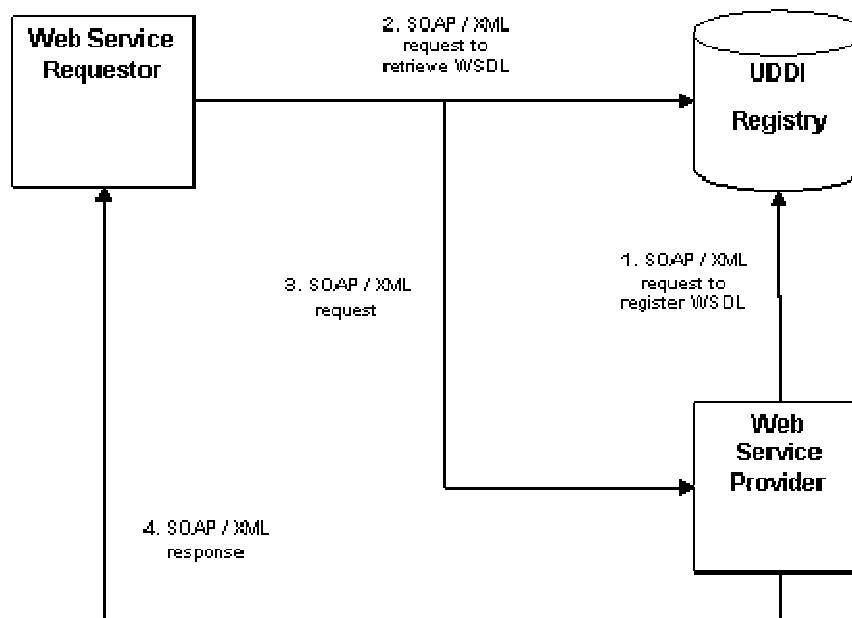
### ***Guidance***

- All connections to the [LDAP](#) repository must be performed using [LDAP](#) 3.0. [[G1377](#)]
- Encrypt the [LDAP](#) repository. [[G1378](#)]

## *Service Oriented Architectures*

### **XML Web Services**

An [SOA](#) is a way to describe a software application that exposes its interfaces as a set of services that produce and consume [SOAP](#) formatted [XML](#) messages. These interfaces are known as [XML Web Services](#) and their capabilities, requirements and usage are described in an [XML](#) formatted [WSDL](#) file. This [WSDL](#) file can be consumed by a requestor to learn about the [Web Service](#) interfaces available within an [SOA](#). A provider may publish its [WSDL](#) file to a [UDDI](#) registry so a requestor can dynamically discover and use the [Web Service](#).

**Figure 1**

It is apparent from Figure 1, that [XML Web Services](#) introduces many security challenges. For example,

### Authentication

A hacker may try to spoof the identity of a user to gain access to a service.

A hacker may tamper with the WSDL file of a Web Service provider in order to spoof an endpoint.

### Integrity

A hacker may intercept a message and change its contents.

- Confidentiality

A hacker may try to read the contents of a message to obtain private information.

The Web Services industry addresses these threats at the message level by incorporating existing technologies for challenging authentication, protecting integrity and ensuring confidentiality.

Web Service security [*WS-Security*] is based on the requirement that incoming SOAP formatted XML messages provide a set of claims or assertions [*WS-Trust*] made about the sender. These claims are cryptographically endorsed by an issuing authority [XML Signature] and placed into a sender's message as security tokens. Parts of the message are then encrypted [XML Encryption] and sent to a Web Service provider.

Web Service providers express their required claims using a policy [*WS-Policy*]. In particular, security claims or assertions [*WS-PolicyAssertions*, *WS-PolicyAttachment*] are expressed using a security policy [*WS-SecurityPolicy*]. A sender uses the security policy to build a message that conforms with the Web Service providers security requirements.

The following defines the list of specifications in the XML Web Services space:

- WS-Security – describes how to attach tokens, Digital Signatures and encrypted elements to a SOAP message. Token can be binary like X.509 or XML-based like SAML (see Web Services Security: SAML Token Profile)
- XML encryption
- XML Signature
- WS-Trust – describes how a message proves a set of claims (name, key, permission, etc.) and it explains how to communicate with a token service to obtain a token
- WS-Policy – describes how a Web Service indicates its security requirements (required security tokens, supported encryption algorithms, etc.)
- WS-SecurityPolicy
- WS-PolicyAssertions

- WS-PolicyAttachment

## **General Web Services**

Future topic for WS SME.

### ***Guidance***

- Use [SOAP](#) standard for all [Web Services](#). [G1356]
- Do not rely on transport level security like [SSL](#) or [TLS](#). [G1357]
- Turn on auditing and sign the audit logs. [G1358]
- Do not place [Web Service](#) security policies inside a [UDDI](#) registry. Put all security policies in the [WSDL](#) file. [G1359]
- Use the [XML](#) Infoset standard to serialize [message](#). [G1360]
- Service providers should place their canonicalization method inside the [WSDL](#) file as an assertion(portType binding or port). [G1361]
- Use very intensive input validation (using a [schema](#)). [G1362]



## **Authentication**

Authentication ensures that the sender of the message is genuine.

### ***Guidance***

- Do not use clear text passwords. [\[G1363\]](#)
- Hash all passwords using the combination of a timestamp, a nonce and the password for each message transmission. [\[G1364\]](#)
- Specify a timeout value for all security tokens. [\[G1365\]](#)

## ***Integrity***

Integrity ensures that a message cannot be changed without detection by an unauthorized third party during transmission.

### ***Guidance***

- Sign all [message](#). [G1366]
- Sign only the part of the [message](#) that needs to be signed. [G1367]
- Sign any part of a [message](#) not [encrypted](#). [G1368]
- Sign all requests made to a security token service. [G1369]
- Sign all [WSDL](#) files. [G1370]
- Use the [Digital Signature Standard](#) for creating [Digital Signatures](#). [G1371]
- Use an X.509 [Certificate](#) to pass a [Public Key](#). [G1372]

## **Confidentiality**

Confidentiality ensures that a message cannot be read by an unauthorized third party during transmission.

### ***Guidance***

- [Encrypt](#) all [message](#). [G1373]
- [Encrypt](#) only the part of the [message](#) that needs to be [encrypted](#). [G1374]
- Use [Asymmetric Encryption](#). [G1375]
- Do not [encrypt](#) key elements that are needed for correct [SOAP](#) processing. [G1376]

*Identity Management Framework*

*Lightweight Directory Access Protocol (LDAP)***Lightweight Directory Access Protocol (LDAP)**

[Lightweight Directory Access Protocol](#) can be thought of as a datastore. It is an open Internet standard produced by the [Internet Engineering Task Force \(IETF\)](#). [LDAP](#) is, like X.500, both an information model and a protocol for querying and manipulating it. [LDAP](#)'s overall data and namespace model is essentially that of X.500. The major difference is that the [LDAP](#) protocol itself is designed to run directly over the [TCP/IP](#) stack, and it lacks some of the more esoteric DAP protocol functions. [LDAP](#) can store text, photos, [URLs](#), pointers to whatever, binary data, and [Public Key Certificates](#).

***Guidance***

- All connections to the [LDAP](#) repository must be performed using [LDAP](#) 3.0. [[G1377](#)]
- Encrypt the [LDAP](#) repository. [[G1378](#)]

### ***Federation***

[Federation](#) works with provisioning [Component](#) and is a service that pushes the user credential from one domain to another. This service is provided to allow users to login into the local network. This may also improve performance in large scale environment. This is one method for authenticating to and accessing resources in other domains. The other method that is being used is the sending of a [SAML](#) assertion into a [trusted domain](#).

The federation of user identities can be provided by a variety of technologies. Database, [LDAP](#) and [Metadata Registry](#) can all be used to federate user identities.

## Single Sign On (SSO)

### *Single Sign On (SSO)*

Single sign on (SSO) is mechanism whereby a single action of user authentication and authorization can permit a user to access all computers and systems where he has access permission, without the need to enter multiple passwords. SSO is generally found to be most useful when using portals that aggregate information.

### ***Metadata Registry (used for federating)***

[Metadata Registry](#) technology provides for the capability to connect disparate data sources together. Database technology is generally used to support the elaborate functions of most [Metadata Registry](#) products. [Schema](#) changes, database joins and attribute mapping are some of the essential capabilities provided to support connecting information sources together in a consistent fashion. [Metadata Registry](#) is also used to support federation of user credentials.



## ***Provisioning***

Provisioning is the user credential generation process. The provisioning of a user can be provided by a variety of technologies such as Database, [LDAP](#) and meta-directory technology.

- Database
- [LDAP](#)
- [Metadata Registry](#)

## ***Guidance***

**Topic:** Guidance Details will be provided in Version 1.3.

## **Business Function Element**

### ***Business Function Element***

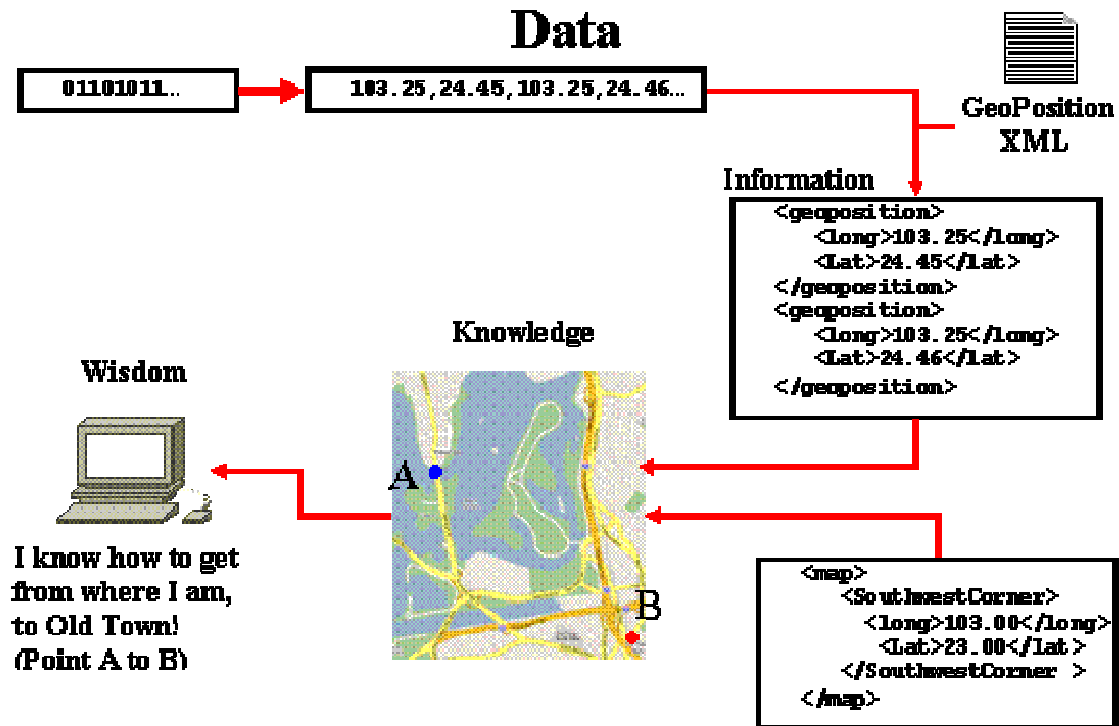
## Data

### Data

Before any discussion of data can be undertaken, Data needs to be defined. There are several common definitions which are the starting point for this discussion:

- Data is [information](#) without context.
- [Data](#) is unprocessed information.

But both of these definitions rely on the term “information”, which can be a circular definition back to data. To clarify this, the following model will be used to help create definitions of [Data](#), [Information](#), [Knowledge](#) and [Wisdom](#). Data flows into the [system](#) as a set of zeros and ones. The Data is then transformed into other Data that is more understandable from a human perspective (i.e. a list of double precision, floating point numbers). If the numbers are placed into a context such as it is a geographic position, then the Data starts to become Information. As Information is combined together, the result is referred to as [Knowledge](#) (i.e. the knowledge of where one is). When the knowledge can be used to make decisions, the results are wisdom (i.e. how to get from point A to point B).



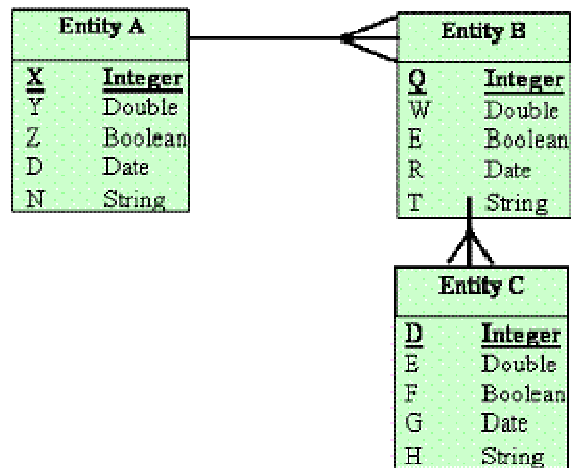
Within NESI, the term Data will cover the entire data spectrum (i.e. [Data](#), [Information](#), [Knowledge](#) and [Wisdom](#)) and will focus on the transfer of data between components. There have been several major efforts within the [DoD](#) that have addressed the need to understand, control and document the flow of data between components. NESI is not in competition with these efforts nor is it intended to render these efforts obsolete. NESI provides detailed guidance intended to verify that the concepts and [tenets](#) of these efforts are met.

- [General Data Guidance](#)
  - [Data Modeling](#)
  - [DoD Metadata Registry](#)
  - [Family Of Interoperable Operational Pictures \(FIOP\)](#)
  - [ASD NII Checklist](#)

## General Data Guidance

### *Data Modeling*

Modeling is an essential step in understanding the data that will comprise a system. Before implementing a system, it is important to understand the basic [data elements](#) and the relationships of the elements. The end products of [data modeling](#) can be [XML schemas](#), [RDBMS schema](#) definitions or the data portion of objects.



The following guidance applies to the [data model](#) used to describe the data tier.

### Guidance

- Use standard [data models](#) developed by [Communities of Interest \(COI\)](#) as the basis of program or project data models. [G1141]
- The [data models](#) should contain information necessary to generate a [data dictionary](#). [G1146]
- [Domain analysis](#) should define the constraints on input data validation. [G1147]

- [Normalize](#) the [data models](#). [G1148]

## **Best Practices**

- For [command-and-control](#) systems, use the names defined in the [C2IEDM](#) for data exposed to the outside communities. [BP1254]

## *Metadata Registry*

A Metadata Registry is a central place where [metadata](#) definitions are stored and maintained.

A Metadata registry typically has the following characteristics:

- It is a protected area where only approved individuals may make changes
- It stores [data elements](#) that include both semantics and representations
- The semantic areas of a [metadata](#) registry contain the meaning of a [Data Element](#) with precise definitions
- The representational areas define how the data is represented in a specific format such as within a database or a structure file format such as [XML](#)

Metadata Registries often are stored in an international format called [ISO-11179](#).

A Metadata Registry is frequently set up and administered by an organization's [Data architect](#) or data modeling team.

The [DoD Metadata Registry](#) provides a common source of data information required to promote interoperability in the Net Centric Data Environment.

*Defense Information Systems Agency (DISA) is responsible for data services and other data-related infrastructures that promote interoperability and software reuse in the secure, reliable, and networked environment planned for the DoD's Global Information Grid (GIG). The Metadata Registry and Clearinghouse's primary objective is to provide software developers access to data technologies to support DoD mission applications. Through the Metadata Registry and Clearinghouse, software developers can access registered XML data and metadata components, COE database segments, and reference data tables and related meta-data information such as Country Code and US State Code. These data technologies increase the DoD's core capabilities by integrating common data, packaging database servers, implementing transformation media and using Enterprise data services built from "plug-and-play" components and data access components.*

<http://diides.ncr.disa.mil/mdregHomePage/mdregHome.portal>

In the Net Centric Data Strategy, data sources are called [Data Assets](#). [Data Assets](#) are divided into two generic areas - data and metadata::

Data includes:

- [XML](#) Stored in Repositories (files)
- [Database Data](#)
- Data Services
- Data Streams (real time)
- Sensor Data



- [Message](#) Data (includes [EDI](#))

Metadata includes:

- Metadata Stored in Registries
  - [UDDI](#)
  - [ebXML](#)
  - [DoD Metadata Registry](#)
  - Other [ISO/IEC 11179 Registries](#)
  - [Discovery Metadata](#) stored in Catalogs
- DoD Discovery Metadata Standard ([DDMS](#))
- Interface Metadata ([WSDL](#))
- Structural Metadata ([XSD](#))

[Data](#) comes in many forms. It can be simple or complex; structured or unstructured in nature.

[Simple Structured Data](#) has an uncomplicated data structure. All requisite Metadata is provided and simple data types only are used (e.g., integers, long integers, strings, and simple lists).

[Simple Unstructured Data](#) has uncomplicated data structure but not all requisite Metadata is provided.

[Complex Structured Data](#) has well-defined [metadata](#). It includes data represented in [XML](#) documents with deeply hierarchical and recursive structures. Complex data can be represented in a complex data structure or can be mapped into a relational or flat structure with additional [metadata](#) provided to represent the complex relationships. Although Complex structured data is generically a property of object oriented databases, the Complex Data Structures can be filled from any source.

- Data Includes
  - [XML](#) files
  - defined by [XML Schemas \(XSD's\)](#)
    - [Interface](#)
- Metadata stored in DoD Repository includes
  - [XML Schemas \(XSD's\)](#)
  - Discovery [metadata](#)
    - [WSDL](#)
    - [UDDI](#)
  - Web Service Source Code
  - XSD's include element validation and descriptions
  - XSD's may import other XSDs
  - XSD's are validated
  - [Complex Structured Data](#) follows all of the [XML](#) rules.

**Note:** that the source of this data can be any.

[Complex Semi-Structured Data](#) has partial [metadata](#). It includes data defined in [COBOL](#) copybooks and Electronic Data Interchange standards [ANSI X.12](#) and Health Level 7 (HL7). Semi-structured data can be as complex or more so as any Complex Structured data. It can map into or be [XML](#). It may also be missing some Metadata or an [XSD](#).

[Complex Unstructured Data](#) has little or no [metadata](#). It includes data in binary files, spreadsheets, documents, and print streams.

## Guidance

- Be associated with one or more [communities of interest \(COI's\)](#). [G1382].
- Use a [registered namespace](#) in the [XML Gallery](#) in the [DoD Metadata Registry](#). [G1383]
- Review [XML Information Resources](#) in the [DoD Metadata Registry](#) using those which can be reused. [G1384]
- Identify [XML Information Resources](#) for registration in the [XML Gallery](#) of the [DoD Metadata Registry](#). [G1385]
- Review predefined commonly used [data elements](#) in the [Data Element Gallery](#) of the [DoD Metadata Registry](#) using those in the [relational database](#) technology which can be reused in the program. [G1386]
- Identify [data elements](#) developed in the in the [relational database](#) technology during the program for registering in the [Data Element Gallery](#) of the [DoD Metadata Registry](#). [G1387]
- Use predefined commonly used database tables in the [DoD Metadata Registry](#). [G1388]
- Publish database tables which are of common interest by registering them in the [Reference Data Set](#) Gallery of the [DoD Metadata Registry](#). [G1389]
- Standardize on the terminology published by relevant [COIs](#) listed in the [Taxonomy Gallery](#) of the [DoD Metadata Registry](#). [G1390]
- Identify [taxonomy](#) additions or changes in conjunction with the [COIs](#) during the program for potential inclusion in the [Taxonomy Gallery](#) of the [DoD Metadata Registry](#). [G1391]
- Adhere to a common mechanism of service location. [G1392]
- Use the [Department of Defense Metadata Specification \(DDMS\)](#) for standardized tags and taxonomies. [G1125]

## Best Practices

- All DoD Programs requiring a [data model](#) should review the [NATO Generic Hub v.5 model \(LC2IEDM\)](#) as an example of a successful [COI](#) developed model. [BP1404]

## References

- DoD Meta Data Registry for [XSLT](http://diides.ncr.disa.mil/mdregHomePage/mdregHome.portal) samples.  
<http://diides.ncr.disa.mil/mdregHomePage/mdregHome.portal>
- XSLT 1.0 (Extensible Stylesheet Language Transformations), for transforming [XML](#) documents  
<http://www.w3.org/TR/xslt>
- XSLT 2.0 (W3C Working Draft, 5 November 2004)
- <http://www.w3.org/TR/xslt20>
- XSL (Extensible Stylesheet Language) 1.0, presentation rules to transform a document.
- <http://www.w3.org/Style/XSL>
- <http://www.w3.org/TR/xsl>
- CSS (Cascading Style Sheets) versions 1 (CSS1) and 2 (CSS2)
- <http://www.w3.org/Style/CSS>
- <http://www.w3.org/TR/REC-CSS1>
- <http://www.w3.org/TR/REC-CSS2>

## *Family of Interoperable Operational Pictures (FIOP)*

The [FIOP](#) initiative was born out of an effort by the OUSD (AT&L) to solve some of the interoperability deficiencies of C2 systems. That office formed a study group to examine the problem. As a result of AT&Ls proposal, the Services formed a plan of objective to [FIOP](#) and tasked a multi-service group to pursue the [FIOP](#) goals and provide an operational context.

This note documents work in progress part of the [FIOP](#) Initiative - to develop data engineering guidance for acquisition program managers and their developers. This guidance is intended to meet the letter and intent of current and emerging Joint directives while recommending priorities and realistic ways forward for acquisition and development of new and evolving systems when resources are limited.

We have taken the initial [FIOP](#) Guidance statements listed in Appendix A of the [FIOP](#) Data Engineering Guidance document and cross referenced their guidance to NESI guidance and ensured that all pertinent guidance was incorporated into NESI.

**Note:** Guidance statements were not numbered in the [FIOP](#) document and the numbering sequence was created by NESI for this document.

<b>FIOP</b>		<b>NESI</b>	
<b>Item Number</b>	<b>Guidance (Appendix A)</b>	<b>Reference</b>	<b>Comment</b>
1	Programs will participate in <a href="#">COIs</a> as a normal course of doing business	[G1382]	<b>New Guidance:</b> [G1382]
2	Programs will identity relevant <a href="#">COIs</a> and <a href="#">DoD Namespaces</a>	[G1383]	<b>New Guidance:</b> [G1383]
3	Programs will collaborate with <a href="#">COIs</a> and <a href="#">Namespace Managers</a> to promote reuse and cross-coordination of <a href="#">metadata</a>	[G1382]	<b>New Guidance:</b> [G1382]
4	Program Managers will sponsor participation of system developers in the <a href="#">COI</a> process and where appropriate contribute engineering expertise to the <a href="#">COI</a> as a stakeholder SOR.	[G1382]	<b>New Guidance:</b> [G1382]
5	New programs will include community collaboration requirements in acquisition documents are required by NESI	[G1382]	<b>New Guidance:</b> [G1382]
6	Opportunities for reuse of existing data assets will be addressed early in the system engineering process		<b>Best Practice:</b> Candidate
7	SORs will place a priority on data interfaces as they migrate to <a href="#">XML</a> and on data identified as an interoperability challenge		<b>Best Practice:</b> Candidate

8	Ad-hoc <a href="#">COIs</a> , initiated by programs, will not be system-specific or Service-specific and will include users of the data as well as data producers		NESI has no guidance on informal organizations
9	Ad-hoc <a href="#">COIs</a> , initiated by programs will coordinate with appropriate JMT <a href="#">COIs</a> and <a href="#">DoD Namespace Managers</a>		NESI has no guidance on informal organizations
10	Whenever possible, programs will use standard <a href="#">data elements</a> established by <a href="#">COIs</a>	<a href="#">[G1390]</a>	<b>New Guidance:</b> <a href="#">[G1390]</a>
11	Programs will use authoritative <a href="#">metadata</a> established by the JMTs when available		Joint Mission Threads (JMT).
12	Programs will prioritize reuse as follows: 1) reuse existing data elements in the <a href="#">DoD Metadata Registry</a> and Clearinghouse, 2) Reuse existing industry standard <a href="#">data elements</a> 3) develop new <a href="#">data elements</a>	<a href="#">[G1386]</a> <a href="#">[G1388]</a>	<b>New Guidance:</b> <a href="#">[G1386]</a> <b>New Guidance:</b> <a href="#">[G1388]</a>
13	Programs will register newly developed <a href="#">data elements</a> in the <a href="#">DoD Metadata Registry</a> and Clearinghouse	<a href="#">[G1387]</a> <a href="#">[G1389]</a>	<b>New Guidance:</b> <a href="#">[G1387]</a> <b>New Guidance:</b> <a href="#">[G1389]</a>
14	Programs will document and register their reuse of <a href="#">data elements</a> in the <a href="#">DoD Metadata Registry</a> and Clearinghouse	<a href="#">[G1384]</a> <a href="#">[G1386]</a> <a href="#">[G1388]</a>	<b>New Guidance:</b> <a href="#">[G1384]</a> <b>New Guidance:</b> <a href="#">[G1386]</a> <b>New Guidance:</b> <a href="#">[G1388]</a>
15	Registration is mandated for <a href="#">XML</a> elements	<a href="#">[G1385]</a>	<b>New Guidance:</b> <a href="#">[G1385]</a>
16	Registration is strongly encouraged for others.		cannot be tested - too vague
17	Program Managers and System Engineers will collaborate with Node infrastructure acquisition programs		Node information under evaluation.
18	Systems will be built on or migrated to a layered architecture following NESI guidance and consistent with business case analysis	<a href="#">[G1385]</a>	<b>New Guidance:</b> <a href="#">[G1385]</a>
19	Data objects to be exposed to the enterprise will be identified, published and validated early in the data engineering process and updated in a spiral fashion as system development proceeds.		<b>Best Practice:</b> Candidate
20	For new systems, data engineering analysis will be initiated prior to Milestone A		<b>Best Practice:</b> Candidate

21	For SORs, priority will be placed on external interfaces as they migrate to <a href="#">XML</a>		<b>Best Practice:</b> Candidate
22	Initial data engineering analyses will address the following:		<b>Best Practice:</b> Candidate
23	<ul style="list-style-type: none"> <li>What data needs to be exposed at the enterprise and node levels</li> </ul>		<b>Best Practice:</b> Candidate
24	<ul style="list-style-type: none"> <li>Relevant <a href="#">COIs</a> and <a href="#">COI</a> products</li> </ul>		<b>Best Practice:</b> Candidate
25	<ul style="list-style-type: none"> <li>Relevant DoD <a href="#">XML</a> Namespaces</li> </ul>		<b>Best Practice:</b> Candidate
26	<ul style="list-style-type: none"> <li>Relevant architectures and architecture products</li> </ul>		<b>Best Practice:</b> Candidate
27	<ul style="list-style-type: none"> <li>Discovery requirements for external (enterprise and node level) data assets</li> </ul>		Node information under evaluation. Discovery in <a href="#">[G1125]</a>
28	<ul style="list-style-type: none"> <li>Notification requirements for data asset changes</li> </ul>		<b>Best Practice:</b> Candidate
29	<ul style="list-style-type: none"> <li>Cross-domain security exchange requirements for exchanging data assets</li> </ul>		<b>Best Practice:</b> Candidate
30	Use cases will be identified and developed as early in the data engineering process as possible to inform <a href="#">data model</a> development		<b>Best Practice:</b> Candidate
31	As appropriate existing use cases will be reused		<b>Best Practice:</b> Candidate
32	As appropriate an Interaction Model will be developed		cannot be tested
33	Data element definitions will be founded on well-defined data <a href="#">ontologies</a> , <a href="#">taxonomies</a> and vocabularies		<a href="#">[G1390]</a> , <a href="#">[G1391]</a>

34	Whenever possible, standard <a href="#">data elements</a> will be the basis for all <a href="#">data models</a> , including use cases		[G1387], [G1389]
35	Identification of appropriate standards will be coordinated with <a href="#">COIs</a> and node developers		Node information under evaluation.
36	Data element names and <a href="#">metadata</a> will be defined according to the rules and guidelines in <a href="#">ISO/IEC 11179</a> as tailored by relevant <a href="#">COIs</a>	[BP1143]	<b>Exists as:</b> [BP1143]
37	Naming and Design Rules will be documented.		<b>Best Practice:</b> Candidate
38	Developers will develop, maintain and employ <a href="#">data models</a>	[G1141]	<b>Exists as:</b> [G1141]
39	An information model will describe the data at the conceptual/logical level	[G1144]	<b>Exists as:</b> [G1144]
40	A physical model will describe the Database or <a href="#">XML schemas</a>	[BP1143]	<b>Exists as:</b> [BP1143]
41	A meta <a href="#">data model</a> will describe the data representation including data type, precision, range of values, and units of measure	[G1146] [G1147]	<b>Exists as :</b> [G1146] <b>Exists as:</b> [G1147]
42	A metastory for each data element will provide traceability between models and will include relationships to standard <a href="#">data elements</a> and architecture data definitions where appropriate	[G1141] [G1144] [G1146]	This can be accommodated by maintaining a <a href="#">COI ontology</a> or data dictionary and as part of a <a href="#">data model</a>
43	As appropriate, programs will register <a href="#">metadata</a> in the DoD Metadata Clearinghouse		[G1385], [G1387], [G1389]
44	In accordance with <a href="#">COI</a> responsibilities, <a href="#">metadata</a> will be registered in the DoD Registry and Clearing House and placed under configuration control prior to implementation.		[G1382]
45	Reuse of XML <a href="#">metadata/data elements</a> will be registered	[G1384]	Exists as: [G1384]
46	Whenever possible, reuse of non-XML <a href="#">metadata/data elements</a> will be registered	[G1387] [G1389]	Exists as: [G1387], [G1389]
47	All applicable attributes in the DDMS DoD Metadata Specification will be included for registered <a href="#">metadata</a>		[G1385]

48	Whenever possible, <a href="#">metadata</a> will be related to well-defined community standards		<a href="#">[G1382]</a>
49	Developers of systems will capture <a href="#">metadata</a> for both external and internal data assets as early as possible in the lifecycle development		<b>Best Practice:</b> Candidate
50	SORs will place priority on external data assets. Internal data assets will be registered as justified by business case analysis		Can't measure priority or justification
51	Metacards will be developed, maintained, and placed under configuration as appropriate	<a href="#">[G1125]</a>	<b>Exists as:</b> <a href="#">[G1125]</a>
52	Responsibilities will be determined in collaboration with <a href="#">COIs</a> and node developers		Node information under evaluation.
53	Metacards will comply with the <a href="#">DDMS</a> and <a href="#">COI</a> guidance	<a href="#">[G1125]</a>	<b>Exists as:</b> <a href="#">[G1125]</a>
<b>54</b>	A.2 Guidance Summary from Section 3.2		
55	Data engineering analyses will explicitly address how consumers will be able to locate and access data assets	<a href="#">[G1392]</a>	<b>Exists as:</b> <a href="#">[G1392]</a>
56	Preference will be given to open source standards for web services		Too vague. Not testable
57	Authoritative data producers will prepare system and node access plans, collaborating with <a href="#">COIs</a> as appropriate		<b>Defer:</b> Node information under evaluation.
58	Identify potential universe of data consumers		<b>Defer:</b> Node information under evaluation.
59	Identify restrictions on data accessibility		<b>Defer:</b> Node information under evaluation.
60	Determine design constraints and operational impacts of relevant Node infrastructures		<b>Defer:</b> Node information under evaluation.
61	When appropriate, Node Infrastructure designs will be <a href="#">SOAs</a> addressing:		<b>Defer:</b> Node information under evaluation.
62	Requests for prioritization		<b>Defer:</b> Node information under evaluation.
63	Dynamic binding to producer instances		<b>Defer:</b> Node information under evaluation.



64	Fault tolerance		<b>Defer:</b> Node information under evaluation.
65	Asynchronous messaging		<b>Defer:</b> Node information under evaluation.
66	Event monitoring		<b>Defer:</b> Node information under evaluation.
67	<a href="#">Service-level agreement</a> support		<b>Defer:</b> Node information under evaluation.
68	The design will separate the data layer from presentation and business logic	<a href="#">[G1153]</a>	<b>Exists as:</b> <a href="#">[G1153]</a>
69	Common design patterns will be used whenever possible		Too vague. Not testable
70	Automated mechanisms will be used for data mediation/translation whenever possible		Addressed in NESI Mediation section
71	Program clients will be neutral and support standard presentation protocols		Too vague. Not testable
72	<a href="#">XML Schemas</a> will not make any assumptions about the sophistication of tools for creation, management, storage or presentation		Too vague. Not testable
73	Business rules will be adaptable		Too vague. Not testable
74	Business rules will not be encoded in the XML exchange formats	<a href="#">[BP1402]</a>	<b>Exists as:</b> <a href="#">[BP1402]</a>
75	<a href="#">XML Schemas</a> will be validated against the <a href="#">WC3</a> XML Standard 1.0 at design time	<a href="#">[G1084]</a>	<b>Exists as:</b> <a href="#">[G1084]</a>
76	Validation will use <a href="#">COIs</a> tools	<a href="#">[G1084]</a>	<b>Exists as:</b> <a href="#">[G1084]</a>
77	Systems will validate their XML documents against schemas published in the <a href="#">DoD Metadata Registry</a> and Clearinghouse	<a href="#">[G1084]</a>	<b>Exists as:</b> <a href="#">[G1084]</a>
78	As appropriate, developers will design for runtime updates of enhanced schemas	<a href="#">[BP1399]</a>	Exists as: <a href="#">[BP1399]</a>
79	Node infrastructures will support these designs		<b>Defer:</b> Node information under evaluation.
80	Node infrastructure developers will design for runtime validation of schemas including appropriate reach-back to the DoD Registry		<b>Defer:</b> Node information under evaluation.
81	Security marking and dissemination control will conform to the DDMS		Include in Security section

82	Developers will consider access control early in the data asset design process		A design issue - also un-testable
83	Data will be segmented into chunks in accordance with security and export control levels, and encryption and access controls will be applied to the chunks	<a href="#">[BP1403]</a>	Chunking is a technology that can be used for a variety of applications including the managing of streaming data (which may be binary) Placement in Guidance and Best Practice section requires further analysis - <a href="#">[BP1403]</a>

## Guidance

- Be associated with one or more [communities of interest \(COI's\)](#). [\[G1382\]](#).
- Use a [registered namespace](#) in the [XML Gallery](#) in the [DoD Metadata Registry](#). [\[G1383\]](#)
- Review [XML Information Resources](#) in the [DoD Metadata Registry](#) using those which can be reused. [\[G1384\]](#)
- Identify [XML Information Resources](#) for registration in the [XML Gallery](#) of the [DoD Metadata Registry](#). [\[G1385\]](#)
- Review predefined commonly used [data elements](#) in the [Data Element Gallery](#) of the [DoD Metadata Registry](#) using those in the [relational database](#) technology which can be reused in the program. [\[G1386\]](#)
- Identify [data elements](#) developed in the in the [relational database](#) technology during the program for registering in the [Data Element Gallery](#) of the [DoD Metadata Registry](#). [\[G1387\]](#)
- Use predefined commonly used database tables in the [DoD Metadata Registry](#). [\[G1388\]](#)
- Publish database tables which are of common interest by registering them in the [Reference Data Set](#) Gallery of the [DoD Metadata Registry](#). [\[G1389\]](#)
- Standardize on the terminology published by relevant [COIs](#) listed in the [Taxonomy Gallery](#) of the [DoD Metadata Registry](#). [\[G1390\]](#)
- Adhere to a common mechanism of service location. [\[G1392\]](#)

## Best Practices

- Use a [database modeling](#) tool that supports a two-level model ([Conceptual/Logical](#) and [Physical](#)) and [ISO-11179](#) data exchange standards. [\[BP1143\]](#)
- Developers will design for runtime updates of enhanced [schemas](#). [\[BP1399\]](#)
- Business rules will not be encoded in the [XML](#) exchange formats. [\[BP1402\]](#)
- [Data](#) will be segmented into chunks in accordance with security and export control levels, and encryption and access controls will be applied to the chunks. [\[BP1403\]](#)

## **References**

- Network Centric Warfare, Department of Defense, Report to Congress Appendix, 27 July 2001  
[http://www.DoD.mil/nii/NCW/ncw\\_appendix.pdf](http://www.DoD.mil/nii/NCW/ncw_appendix.pdf)

## ASD NII Checklist

The purpose of the Net-Centric Checklist is to assist in the development of programs need in the net-centric environment as part of a [service-oriented architecture \(SOA\)](#) in the [Global Information Grid \(GIG\)](#). A [SOA](#) is a design style for building flexible, adaptable distributed-computing environments for the Department of Defense (DoD). Service-oriented design is fundamentally about sharing and reuse of functionality across diverse applications. There are four sections in the Checklist: [Data](#), Services, IA/Security and Transport.

This section describes how the NESI Guidance relates to the [ASD NII Checklists](#) Data [tenets](#).

ASD (NII) Checklist				NESI	
Section	Data Tenet Name	Text	Rationale	Approach	Comment
I. B. 01	Make data visible	Does the system provide discovery <a href="#">metadata</a> , in accordance with the DoD Discovery Metadata Standard (DDMS), for all data posted to shared spaces?	Rationale Users and applications will migrate from maintaining private data (e.g., data kept within system specific storage) to making data available in community- and Enterprise-shared spaces (e.g., servers and services available on the Internet). Data will migrate from being maintained in private data stores alone, to being made available in community and Enterprise shared spaces.	Answered if <a href="#">DoD Metadata Registry</a> Used. Also <a href="#">[G1125]</a>	Included in DDMS Guidance
I. B. 02	Make data visible	Describe how the system is making its data assets visible to consumers.	Rationale Question will determine whether a consumer needs to know about a data asset and establish a point-to-point connection, or whether the data asset be discovered.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are made available via registered services in the <a href="#">DoD Metadata Registry</a>

I. B. 02	Make data visible	Is all of the data that can and should be shared externally beyond the programmatic bounds of your system visible (i.e., advertised) to all potential consumers of the data?	Rationale Question will identify if the application is making use of Web services to expose its data.	Requires evaluator interaction	This is too subjective and cannot be readily evaluated.
I. B. 03	Make data visible	Describe how consumers are able to locate the data assets available from your system.	Rationale Question will determine whether a consumer needs to know about a data asset and establish a point-to-point connection, or whether the data asset be discovered.	Answered if <a href="#">DoD Metadata Registry</a> Used. Also <a href="#">[G1392]</a>	Data assets are locatable via registered services in the <a href="#">DoD Metadata Registry</a>
I. B. 04	Make data visible	Describe how the system is making use of Web service standards (e.g., <a href="#">SOAP</a> [Simple Object Access Protocol], <a href="#">WSDL</a> [Web Services Description Language], <a href="#">UDDI</a> [Universal Description, Discovery and Integration]) to make its data assets visible.	Rationale: Question will elicit whether the program is taking advantage of some of the open standards for Web services. (Also referenced in Net Centric Operations and Warfare Reference Model)	Answered if <a href="#">DoD Metadata Registry</a> Used. Also <a href="#">[G1125]</a>	Implementation details
I. B. 05	Make data visible	Describe any subscribe/notify mechanisms for the visible data assets available within the program that alert users and other applications when data has been created or updated.	Rationale Question will elicit whether a consumer can be notified when data assets change.	Answered if <a href="#">DoD Metadata Registry</a> Used	Subscription and Notification methods provided in the <a href="#">DoD Metadata Registry</a> registration requirements
I. B. 06	Make data visible	Describe where potential consumers can go to become aware of the data assets being made visible by your program.	Rationale: Question should elicit how the programs data is being advertised to potential consumers.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are made available via registered services in the <a href="#">DoD Metadata Registry</a>

I. B. 07	Make data visible	Describe how the program provides dynamic, flexible, and threat-tailorable solutions for exchanging data assets between different security domains (i.e., cross-domain) with flexibility to accommodate new operational needs with minimal impact on system and mission performance.	Rationale: DoD 8500 series, DCID 6/3	Answered as part of NESI Part 5 Security	Security - Data assets are made available via registered services in the <a href="#">DoD Metadata Registry</a> . Security constraints should be contained therein
I. B. 08	Make data visible	Describe how data posted to shared spaces is controlled and managed by the applicable security policies, or regulations and how these IA controls are enforced. [Ref RCD 4.1, policy management, 4.3.2 , Information Access Management, 4.5 Access Control]	Rationale: Question will elicit details of design of information security characteristics of system data	Answered as part of NESI Part 5 Security	Security
I. C. 01	Make data accessible	Are there any limitations for the client appliance (e.g., workstation, desktop, laptop, PDA [personal digital assistant]) to access your data assets?	Rationale: Question will elicit whether the program is client neutral and supports standard presentation protocols.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are accessible via registered services in the <a href="#">DoD Metadata Registry</a> . This information should be provided therein.
I. C. 01. D	Make data accessible	Describe for each visible data asset what the data consumer needs to access the data (e.g., an application client, a Web portal, access to a Web service, access to a shared data storage area, an <a href="#">XML</a> (eXtensible Markup Language) schema/parser, etc.).	Rationale: Question will elicit whether the program is client neutral and supports standard presentation protocols.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are accessible via registered services in the <a href="#">DoD Metadata Registry</a> . This information should be provided therein.

I. C. 01. F	Make data accessible	Is all of the data that can and should be shared externally beyond the programmatic bounds of your program accessible to all potential consumers of the data with sufficient access permissions and without any additional programming effort?	Rationale: Question will elicit whether the program is client neutral and supports standard presentation protocols.	Requires evaluator interaction	This is too subjective and cannot be readily evaluated.
I. C. 02	Make data accessible	Has the program explicitly identified the potential universe of consumers of that data? (local, <a href="#">COI</a> , enterprise)	Rationale: Designers will focus on the immediate requirement for satisfying sponsor demands.	Answered if <a href="#">DoD Metadata Registry</a> Used	Any consumer who has access to the <a href="#">DoD Metadata Registry</a> .
I. C. 03	Make data accessible	Describe the programs architecture and the data separation from the presentation and business logic.	Rationale: Question will elicit whether the program is an n-tier architecture where the data has been isolated from the business logic.	Requires evaluator interaction	Implementation details
I. C. 04	Make data accessible	Describe the security mechanisms used to restrict access to specific, visible data assets. How will the associated <a href="#">metadata</a> labels be used to support these security mechanisms? (ref. RCD 4.1, IA Policy Management, 4.3.2 Information Access Management, 4.5 Access Control)	Rationale: Question will elicit whether appropriate security has been placed on data assets.	Answered as part of NESI Part 5 Security	Security

I. C. 05	Make data accessible	What mechanisms are planned/implemented to protect the data in transit to the consumer? This would include protection from modification of the data, protection from unauthorized eavesdropping, or protection from data becoming lost in transit. [ref RCD 3.1 Confidentiality, 4.1, IA Policy Management, 4.6.1, EIAU Management]	Rationale: Question will elicit information on what confidentiality , integrity, and availability mechanisms beyond Inline Network Encryptor (INE) functions are in the system design.	Answered as part of NESI Part 5 Security	Security
I. C. 06	Make data accessible	What mechanisms are planned/implemented to protect the data at rest within a consumer client? This would include protection from modification of the data, protection from unauthorized disclosure, or protection from data becoming corrupted or otherwise unavailable for mission use. [ref RCD 3.1 Confidentiality, 4.1, IA Policy Management, 4.6.1, EIAU Management]	Rationale: Question will elicit information on what confidentiality , integrity, and availability mechanisms are envisioned where the end-user will be processing GIG data.	Answered as part of NESI Part 5 Security	Security



I. C. 07	Make data accessible	What mechanisms are planned/implemented to protect the data at rest within the service providers systems? This would include protection from modification of the data, protection from unauthorized eavesdropping, or protection from data becoming corrupted or otherwise unavailable for mission use. [ref RCD 3.1 Confidentiality, 4.1, IA Policy Management, 4.6.1, EIAU Management]	Rationale: Question will elicit information on what confidentiality , integrity, and availability mechanisms are envisioned where the end-user will be processing <a href="#">GIG</a> data.	Answered as part of NESI Part 5 Security	Security
I. C. 08	Make data accessible	Describe how the visible data assets are made available to other users outside the Community of Interest with a need for the data.	Rationale Question should help the assessor determine how easily the data is accessible.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are accessible via registered services in the <a href="#">DoD Metadata Registry</a> . Any consumer who has access to the <a href="#">DoD Metadata Registry</a> will have access to these data assets.
I. C. 09	Make data accessible	Describe the common design patterns employed in the program that aid in the accessibility of data assets.	Rationale Question will elicit whether the program is making use of design patterns to simplify and standardize how data assets are accessed.	Requires evaluator interaction	Content management systems acting as the data catalog for unstructured collections or structured data archives/warehouses as data catalogs service generated data
I. C. 10.00	Make data accessible	Describe the use within the program of the following design patterns:	Rationale Question will elicit more detailed discussion than the previous question. However, the program will not necessarily employ all of these patterns.	Requires evaluator interaction	Implementation details

I. C. 10.01	Make data accessible	· Request-Response	Rationale Question will elicit more detailed discussion than the previous question. However, the program will not necessarily employ all of these patterns.	Requires evaluator interaction	Implementation details
I. C. 10.02	Make data accessible	· Publish-Subscribe	Rationale Question will elicit more detailed discussion than the previous question. However, the program will not necessarily employ all of these patterns.	Requires evaluator interaction	Implementation details
I. C. 10.03	Make data accessible	· Transactional or Read-Only	Rationale Question will elicit more detailed discussion than the previous question. However, the program will not necessarily employ all of these patterns.	Requires evaluator interaction	Implementation details
I. C. 10.04	Make data accessible	· Synchronous or Asynchronous	Rationale Question will elicit more detailed discussion than the previous question. However, the program will not necessarily employ all of these patterns.	Requires evaluator interaction	Implementation details
I. C. 10.05	Make data accessible	· Model-View-Controller	Rationale Question will elicit more detailed discussion than the previous question. However, the program will not necessarily employ all of these patterns.	Requires evaluator interaction	Manual

I. C. 11	Make data accessible	Describe how the program provides assurance that there is timely and reliable access to data assets anytime, anywhere for authorized users/entities. Availability is a core IA function that is critical to ensuring successful mission execution.	Rationale: DoD 8500 series, DCID 6/3. Integrity is a core information assurance (IA) function, and is necessary to provide confidence in data received.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are accessible via registered services in the <a href="#">DoD Metadata Registry</a> . This information should be provided therein.
I. C. 12	Make data accessible	Describe how access control and IA policy enforcement will be used to ensure that only authorized users/entities can access restricted data. (ref. RCD 4.2.2 Authorization/Privilege Management, 4.3.2 Information Access Management, 4.5 Access Control)	Rationale: Question will elicit information on how access control will be implemented in the context of GIG wide access control policies and identity management.	Answered as part of NESI Part 5 Security	Security
I. D. 01. D	Make data understandable	Describe how the program tags data with discovery <a href="#">metadata</a> .	Rationale Metadata tagging enables users to discover the data for retrieval. The assessor should assess whether sufficient use of <a href="#">metadata</a> is being made.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets in the <a href="#">DoD Metadata Registry</a> should be tagged with discovery <a href="#">metadata</a> as per <a href="#">DDMS</a> . Automated tagging is best. There can be variability in the granularity of the data asset tagged but data catalogs should allow discovery <a href="#">metadata</a> registration per <a href="#">DDMS</a> and search per <a href="#">DDMS</a> criteria

I. D. 01-> F	Make data understandable	Is all of the data that can and should be shared externally beyond the programmatic bounds of your program sufficiently documented and understandable that any potential consumer can comprehend the structural and semantic meaning to determine if they can reliably use the <a href="#">metadata</a> to make access control decisions on sensitive data? (ref. RCD 4.3.1 Information Labeling Management, 4.5 Access Control)	Rationale: Question will indicate how registered <a href="#">metadata</a> are being used for access control decisions on system data assets.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are accessible via registered services in the <a href="#">DoD Metadata Registry</a> . The information provided therein should be adequate.
I. D.02	Make data understandable	Is all of the data that can and should be shared externally beyond the programmatic bounds of your program sufficiently documented and understandable that any potential consumer can comprehend the structural and semantic meaning to determine how they may use it appropriately?	Rationale Metadata tagging enables users to discover the data for retrieval. The assessor should assess whether sufficient use of <a href="#">metadata</a> is being made.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are accessible via registered services in the <a href="#">DoD Metadata Registry</a> . This information should be provided therein.
I. D. 03	Make data understandable	Explain how the program is making use of the <a href="#">DoD Metadata Registry</a> and Clearinghouse.	Rationale Question will elicit indications of whether discovery <a href="#">metadata</a> is being generated that is compliant with the DoD Discovery Metadata Specification.	Answered if <a href="#">DoD Metadata Registry</a> Used	Data assets are accessible via registered services in the <a href="#">DoD Metadata Registry</a> . This information should be provided therein.
I. D. 04	Make data understandable	Has the <a href="#">DoD Metadata Registry</a> been used whenever possible?	Rationale Question will elicit whether the program is making use of existing, registered <a href="#">data elements</a> from the Registry.	Answered if <a href="#">DoD Metadata Registry</a> Used	Included in <a href="#">DoD Metadata Registry</a> requirements.

I. D. 04	Make data understandable	Have newly defined XML elements been registered with the Registry?	Rationale Question will elicit whether the program is making use of existing, registered <a href="#">data elements</a> from the Registry.	Answered if <a href="#">DoD Metadata Registry</a> Used	Included in <a href="#">DoD Metadata Registry</a> requirements.
I. D. 04. D	Make data understandable	Describe the source of all XML elements.	Rationale Question will elicit whether the program is making use of existing, registered <a href="#">data elements</a> from the Registry.	Answered if <a href="#">DoD Metadata Registry</a> Used	Included in <a href="#">DoD Metadata Registry</a> requirements.
I. D. 05	Make data understandable	Describe any data schemas or standards being applied in the program.	Rationale Question will elicit whether the program is using <a href="#">XML Schemas</a> , DTDs [Document Type Definition], or something similar to describe its data assets.	Answered if <a href="#">DoD Metadata Registry</a> Used	Included in <a href="#">DoD Metadata Registry</a> requirements.
I. D. 06	Make data understandable	Describe any automated mechanisms that are available for data mediation/translation (e.g., <a href="#">XSL</a> [eXtensible Stylesheet Language], <a href="#">XSD</a> [XML Schema Definition]).	Rationale Question will elicit any data translation capabilities that are available.	Answered if <a href="#">DoD Metadata Registry</a> Used	Included in <a href="#">DoD Metadata Registry</a> requirements.
I. D. 07	Make data understandable	Describe any automated mechanism that enforce translation of security markings from one policy domain to another. (ref. RCD 4.1 IA Policy Management)	Rationale: Question will elicit any capability to move data from one policy domain (e.g., U.S. Only) to another (e.g., <a href="#">NATO</a> )	Answered as part of NESI Part 5 Security	Security
I. E. 01	Make data trustable	Can all potential consumers of all of the data available from your program determine the data pedigree (i.e., derivation and quality), security level, and access control level of your data?	Rationale: Question will elicit how a consumer can determine data asset quality.	Answered if <a href="#">DoD Metadata Registry</a> Used. Further criteria to be established when this section needs to be connected to the NESI Security section	Included in <a href="#">DoD Metadata Registry</a> requirements. Trust here is a function of access to data asset pedigree and identified authoritative sources per <a href="#">DDMS</a> . Our approach should be consistent with this.

I. E. 02	Make data trustable	Describe for each visible data asset in the program whether the program is the authoritative data source.	Rationale: Question will elicit whether any data assets are secondary sources.	Answered if <a href="#">DoD Metadata Registry</a> Used	Included in <a href="#">DoD Metadata Registry</a> requirements.
I. E. 03	Make data trustable	Describe what measures the program takes to ensure the integrity of the data (for internally used data, externally used data, and data that simply transits the program).	Rationale: Question will elicit whether data assets are protected against man-in-the-middle types of IA attacks.	Answered as part of NESI Part 5 Security	Security
I. E. 04	Make data trustable	Describe what measures the program takes to ensure that the program data is only provided to consumers via authorized sources. [ref RCD 3.2 Integrity, 4.4 Authentication]	Rationale: Question will elicit whether data assets are protected against man-in-the-middle types of IA attacks.	Answered as part of NESI Part 5 Security	Security
I. F. 01. D	Make data interoperable	Describe any programming changes that would need to be made to the program if a new consumer of a visible data asset were identified.	Rationale: Question will elicit whether new consumers can be added with no additional cost/effort or whether a new point-to-point interface needs to be established.	Requires evaluator interaction	Vague
I. F. 01. F	Make data interoperable	Does all of the data that can and should be shared externally beyond the programmatic bounds of your program have sufficient metadata descriptions and automated support to enable for mediation and translation of the data between interfaces?	Rationale: Question will elicit whether new consumers can be added with no additional cost/effort or whether a new point-to-point interface needs to be established.	Answered if <a href="#">DoD Metadata Registry</a> Used	Fits into DDMS and <a href="#">DoD Metadata Registry</a> Req's. Currently the MDR can store <a href="#">XSL</a> to support mediation but much work is needed in this area

I. F. 02	Make data interoperable	Identify the published net-centric interoperability standards (e.g., DDMS) to which the program adheres. (ref. RCD 3.4 Availability)	Rationale: Question will help to identify programs that have thought through customer service and planned for accommodating changing consumer needs.	Answered if <a href="#">DoD Metadata Registry</a> Used	The approach should reference NR-KPPs and KIPs
I. F. 03	Make data interoperable	Describe the process a consumer would follow to a) request changes in the format (syntax or semantic) of the visible data asset; b) report a problem with a data asset; or c) request additional data from the data provider.	Rationale: Question will help to identify programs that have thought through customer service and planned for accommodating changing consumer needs.	Answered if <a href="#">DoD Metadata Registry</a> Used	Vague
I. G. 01. D	Provide Data Management	Describe the effort associated with the program to define, develop, and maintain an <a href="#">ontology</a> (i.e., schemas, thesauruses, vocabularies, key word lists, and taxonomies) that best reflects the community understanding of the visible data assets.	Rationale: Question will elicit the data survivability capability of the program and the consumers experience as a result.	Requires evaluator interaction and <a href="#">COI</a> participation	Fits into <a href="#">Ontology</a> requirement
I. G. 01. F	Provide Data Management	Is there sufficient management of all of the data available through your program to adequately maintain and improve your data assets within a changing environment?	Rationale: Question will elicit the data survivability capability of the program and the consumers experience as a result.	Requires evaluator interaction	Vague
I. G. 02	Provide Data Management	Describe your processes for ensuring the usefulness and timely availability of all data assets associated with your program.	Rationale: Question will elicit the data survivability capability of the program and the consumers experience as a result.	Requires evaluator interaction	Vague

I. G. 03	Provide Data Management	Describe the various data survivability scenarios considered in your program.	Rationale: Question will elicit the data survivability capability of the program and the consumers experience as a result.	Requires evaluator interaction	Vague
I. H. 01	Be Responsive to User Needs	Are perspectives of users, whether data consumers or data producers, incorporated into data approaches via continual feedback to ensure satisfaction?	Rationale: This question helps determine if the program is putting in place appropriate mechanisms to enable responsiveness to user data and application needs.	Requires evaluator interaction	Vague
I. H. 02	Be Responsive to User Needs	What tools, services, processes, and resources is the program providing to facilitate user feedback and program responsiveness with respect to data needs?	Rationale: This question helps determine if the program is putting in place appropriate mechanisms to enable responsiveness to user data and application needs.	Requires evaluator interaction	Vague
I. H. 03	Be Responsive to User Needs	What metrics are being used to determine responsiveness to user data needs?	Rationale: This question helps determine the programs ability to measure its responsiveness to user data and application needs.	Requires evaluator interaction	Vague
I. H. 04	Be Responsive to User Needs	What is the degree of collaboration with respect to data that is enabled and is occurring among the user community (ies) and the program developers?	Rationale: This question helps assess the actual degree of visibility into ongoing user needs and the responsiveness and quality of interaction with respect to user data and application needs.	Answered if <a href="#">DoD Metadata Registry</a> Used	Fits into the <a href="#">COI</a> requirement



I. H. 05	Be Responsive to User Needs	What are measured/assessed trends over time with respect to the programs responsiveness to user data needs and degree of satisfaction towards meeting those needs?	Rationale: This question helps determine the degree of program improvement in being responsive to user data and application needs over time.	Requires evaluator interaction	Vague
I. H. 06	Be Responsive to User Needs	What are the programs plans to enhance responsiveness to user data needs?	Rationale: This question helps determine potential for improving future responsiveness to user data and applications needs.	Requires evaluator interaction	Vague
I. I. 07	Ensure authorized users obtain reliable secure information	Describe the protection mechanisms for program data to ensure that undetected compromises are contained and do not allow an adversary to access restricted or sensitive program data while still maintaining visibility to authorized users? [ref RCD 4.1 Confidentiality (attribute to be added to address this issue)]	Rationale: This question helps determine capability to perform in the face of adversarial disruption.	Answered as part of NESI Part 5 Security	Security
I. I. 08	Ensure authorized users obtain reliable secure information	Describe the techniques that inhibit an adversary who has compromised a client or server from accessing all sensitive program data and services within the enterprise. [ref RCD 4.1 Confidentiality (attribute to be added to address this issue)]	Rationale: This question elicits the design techniques used to manage controlled sharing of sensitive data	Answered as part of NESI Part 5 Security	Security

## Guidance

- Be associated with one or more [communities of interest \(COI's\)](#). [G1382].
- Use a [registered namespace](#) in the [XML Gallery](#) in the [DoD Metadata Registry](#). [G1383]
- Review [XML Information Resources](#) in the [DoD Metadata Registry](#) using those which can be reused. [G1384]

- Identify [XML Information Resources](#) for registration in the [XML Gallery](#) of the [DoD Metadata Registry](#). [G1385]
- Review predefined commonly used [data elements](#) in the [Data Element Gallery](#) of the [DoD Metadata Registry](#) using those in the [relational database](#) technology which can be reused in the program. [G1386]
- Identify [data elements](#) developed in the in the [relational database](#) technology during the program for registering in the [Data Element Gallery](#) of the [DoD Metadata Registry](#). [G1387]
- Use predefined commonly used database tables in the [DoD Metadata Registry](#). [G1388]
- Publish database tables which are of common interest by registering them in the [Reference Data Set](#) Gallery of the [DoD Metadata Registry](#). [G1389]
- Standardize on the terminology published by relevant [COIs](#) listed in the [Taxonomy Gallery](#) of the [DoD Metadata Registry](#). [G1390]
- Adhere to a common mechanism of service location. [G1392]

## *References*

- Net-Centric Checklist, July 30, 2004, Version 2.1.4

## *XML*

## *XML*

**Note:** This section is under construction and is scheduled for re-delivery in 1.3.

[XML](#) is a popular new technology that many developers are capitalizing on. For general guidance, use one of the many [XML](#) developer's guides available.

This section focuses on interfacing with other applications and enterprise components. It contains the following topics:

- [Wrapping XML parsers](#)
- Parsing [XML](#) strategies

## *References*

- For information on [XML schemas](#) and repositories, see <http://diides.ncr.disa.mil/mdregHomePage/mdregHome.portal>.
- For information on the Department of the Navy's XML policies, see <http://quickplace.hq.navy.mil/navyxml> or contact Bob Green, Office of the [DON](#) CIO, [robert.a.green2@navy.mil](mailto:robert.a.green2@navy.mil).

## Wrapping XML Parsers

Wrapping the [parser](#) promotes interoperability with other systems by reducing coupling and minimizing the impact of enterprise change on the applications.

The enterprise will publish an [API](#) wrapper to an [XML](#) parser and an [XSLT](#) processor. All applications using [XML](#) will use these wrapper classes. When they are available, you will be able to download them from the NESI open-source site.

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### *Examples*

#### **Sample wrapper class**

This figure shows a sample wrapper class for an [XML](#) parser:

```
import java.io.*;
import org.w3c.dom.*;
import java.util.*;
import javax.xml.parsers.*;
public class XMLWrapper
{
    private Document document;
    public void initialize( )
    { try
        { System.setProperty
            ( "javax.xml.parsers.DocumentBuilderFactory",
              "org.apache.xerces.jaxp.DocumentBuilderFactoryImpl"
            );
            System.setProperty
            ( "javax.xml.parsers.SAXParserFactory",
              "org.apache.xerces.jaxp.SAXParserFactoryImpl"
            );
            DocumentBuilderFactory dbf
            = DocumentBuilderFactory.newInstance();
            DocumentBuilder db = dbf.newDocumentBuilder();
            document = db.newDocument();
        } // End try
        catch ( DOMException domex )
        { domex.printStackTrace();
        } // End catch DOMException
        catch ( ParserConfigurationException pcex )
        { pcex.printStackTrace();
        } // End catch ParserConfigurationException
    } //end init
    //public API's
    public Node setRootNode
    ( String rootElement )
    {
        try
        { Node rootNode = document.createElement( rootElement );
          document.appendChild( rootNode );
          return rootNode;
        } // End try
        catch ( DOMException domex )
        { domex.printStackTrace();
        } // End catch DOMException
        return null;
    } // End setRootNode
    public Node addChild
    ( Node parentNode, String element )
    { parentNode.appendChild
      ( document.createElement ( element ) );
      return parentNode.getLastChild();
    } // End addChild
    public void addTextNode
    ( Node parentNode, String element )
```

```

    { parentNode.appendChild
      ( document.createTextNode( element ) );
    } // End addTextNode
    public void addCommentNode
      ( Node parentNode, String element )
    { parentNode.appendChild
      ( document.createComment( element ) );
    } // End addCommentNode
    public void addCommentNodeDoc
      ( String element )
    { document.appendChild
      (document.createComment( element ));
    } // End addCommentNodeDoc
    public void addPINodeDoc
      ( String target,
        String value
      )
    { document.appendChild
      ( document.createProcessingInstruction
        ( target,
          value
        )
      );
    } // End addPINodeDoc
    public void addPINode
      ( Node parentNode,
        String target,
        String value
      )
    { parentNode.appendChild
      ( document.createProcessingInstruction
        ( target,
          value
        )
      );
    } // End addPINode
  } // End initialize
} //end XMLWrapper

```

## Sample object

This figure shows a sample object using the XML parser wrapper:

```

private static void buildXMLDocument()
{ //build up a weather report
  XMLCreator xmlCreator = new XMLCreator();
  xmlCreator.initialize();
  xmlCreator.addCommentNodeDoc
    ( "generate xml from a soap client");
  xmlCreator.addPINodeDoc
    ( "xml:stylesheet",
      "type = \"text/xsl\" href = \"weather.xsl\""
    );
  Node weatherNode
    = xmlCreator.setRootNode
      ( "weatherReport");
  xmlCreator.addTextNode
    ( xmlCreator.addChild
      ( weatherNode,
        "location"
      ),
      weatherReport[0]
    );
  xmlCreator.addTextNode
    ( xmlCreator.addChild
      ( weatherNode,
        "wind"
      ),
      weatherReport[1]
    );
}

```

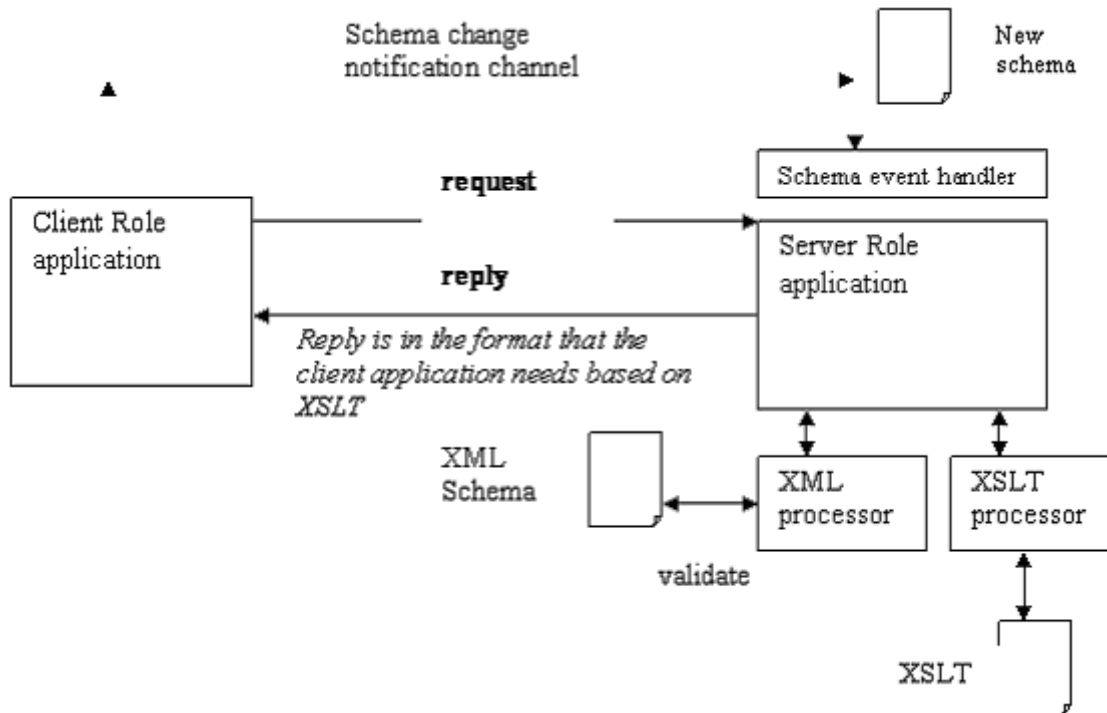
```

xmlCreator.addTextNode
( xmlCreator.addChild
  ( weatherNode,
    "SkyConditions"
  ),
  weatherReport[2] );
xmlCreator.addTextNode
( xmlCreator.addChild
  ( weatherNode,
    "Visibility"
  ),
  weatherReport[3] );
xmlCreator.addTextNode
( xmlCreator.addChild
  ( weatherNode,
    "Temperature"
  ),
  weatherReport[4] );
xmlCreator.addTextNode
( xmlCreator.addChild
  ( weatherNode,
    "Pressure"
  ),
  weatherReport[5] );
xmlCreator.addTextNode
( xmlCreator.addChild
  ( weatherNode,
    "Humidity"
  ),
  weatherReport[6] );
xmlCreator.addTextNode
( xmlCreator.addChild
  ( weatherNode,
    "Wind2"
  ),
  weatherReport[7] );
weatherDoc = xmlCreator.getDocument();
} //end buildXMLDocument

```

## Parsing XML Strategies

Passing [XML](#) back and forth between systems imposes significant overhead. As more client-side applications use “services,” parsing multiple [XML](#) outputs from multiple web services will impact the performance of the client-side application.



## Best Practices

- All data transferred via [XML](#) should explicitly define the encoding style. [BP1258]
- [XML](#) validation is the responsibility of the [XML](#) document generator. [BP1265]

## References

- Won Kim. [Introduction to Object-Oriented Databases](#). Computer Systems. MIT Press, Cambridge, MA, 1990.
- Application Architecture: An N-Tier Approach - Part 1: <http://www.15seconds.com/issue/011023.htm>
- SQL:1999, formerly known as SQL3: <http://dbs.uni-leipzig.de/en/lokal/standards.pdf>
- Database Journal: <http://www.databasejournal.com/>
- Crossing Chasms Pattern Language Object to RDBMS: <http://c2.com/cgi/wiki?CrossingChasms>
- Object Data Management Group (ODMG): <http://www.odmg.org/>
- Object Management Group (OMG): <http://www.omg.org/>
- Native XML database vendors: <http://www.rpbouret.com/xml/XMLDatabaseProds.htm#native>

- [C2IEDM data model](http://www.mip-site.org/) specifications: <http://www.mip-site.org/>



## Mediation Services

### *Mediation Services*

Mediation is defined as a set of negotiated agreements for interacting between [components](#) that enable those [components](#) to work together to perform a task. These agreements are defined through standard [interfaces](#) and [data](#) interchange specifications.

[Mediation services](#) provide multiple methods for integrating [data](#) sources and [services](#):

- [Transformation](#)
- [Aggregation](#)
- [Adaptation](#)
- [Orchestration](#)
- [Choreography](#)



# Guidance Details

## G1001

### Statement

Define public [interfaces](#) in a formal standard.

### Rationale

It's important that a common language is used to define the interfaces so producers and consumers can work independently and together.

There are many standards for defining interfaces ([UML](#), [WSDL](#), and [CORBA](#)).

The standard used must be documented and widely accepted by the industry.

### Derived From

### Justifies

### Referenced By

*Publish and insulate public interfaces*

### Acquisition Phase

Development

### Evaluation Criteria

- |    |                  |  |
|----|------------------|--|
| 1. | <b>Test</b>      | <i>Do <a href="#">UML</a> documents exist that describe the shared interfaces?</i>         |
|    | <b>Procedure</b> | Ask for the design documents to be provided during the review process.                     |
|    | <b>Examples</b>  | None   |
| 2. | <b>Test</b>      | <i>Are there <a href="#">WSDL</a> files that document the interface to web services?</i>   |
|    | <b>Procedure</b> | Look for the existence of <b>.WSDL</b> files.  |
|    | <b>Examples</b>  | None   |
| 3. | <b>Test</b>      | <i>Are there <a href="#">IDL</a> files that document the interfaces to CORBA services?</i> |
|    | <b>Procedure</b> | Look for the existence of <b>.idl</b> files.   |
|    | <b>Examples</b>  | None   |

## G1002

<b>Statement</b>	Separate public interfaces from implementation.		
<b>Rationale</b>	<p>This guidance encourages clean separation between <i>interface</i> and implementation details for all types of application development. This allows components and systems to be <i>loosely coupled</i>. The flexibility allows groups of developers to work independently and in parallel to the contract defined by the interface.</p> <p>Another benefit of hiding implementation details is that it allows the implementation to change without affecting users of the interface. This means the interface can support dynamic and pluggable implementation.</p>		
<b>Derived From</b>			
<b>Justifies</b>	<a href="#">[G1217]</a> , <a href="#">[G1218]</a> , <a href="#">[G1219]</a> , <a href="#">[G1220]</a> , <a href="#">[G1221]</a>		
<b>Referenced By</b>	<a href="#">Publish and insulate public interfaces</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>C++: Check to make sure interfaces are defined as pure virtual functions.</i>
		<b>Procedure</b>	Make sure C++ classes are defined in header files. Classes that represent external interfaces should contain only pure virtual functions. Make sure the class does not declare non-constant data members. Also, make sure it does not define default implementation. An interface should provide no default behavior.
	<b>2.</b>	<b>Test</b>	<i>C: Check to make sure functions are declared in a header file using prototypes.</i>
		<b>Procedure</b>	Make sure each library function has a prototype declaration in the header file.
		<b>Examples</b>	None

## G1003

<b>Statement</b>	Separate the contents of application libraries that are to be shared from libraries that are to be used internally.		
<b>Rationale</b>	<p>The public libraries that are intended to be shared with outside consumers need to remain fairly static in order to facilitate independent development by the <i>consumer</i> and the <i>producer</i> of the libraries' functionality. Changes in libraries should be mutually agreed upon by both the producer and the consumer.</p> <p>All library content should not have external dependencies that are not related to supporting the interface.</p> <p>There must be clear separation between domain-specific and shared libraries. Libraries that will be used in joint or multiple projects should not have domain-specific code.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Publish and insulate public interfaces</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Do the publicly shared libraries have any private or undocumented functionality?</i>
		<b>Procedure</b>	Check each library against the publicly defined header and make sure that all objects or methods are public.
		<b>Examples</b>	None
	2.	<b>Test</b>	<i>Does the library contain extraneous interfaces or code that is not required?</i>
		<b>Procedure</b>	Use coverage tool/Junit to make sure there is no extraneous code.
		<b>Examples</b>	None
	3.	<b>Test</b>	<i>Do the publicly shared libraries have any private or undocumented functionality?</i>
		<b>Procedure</b>	Check to make sure that one library use of another library does not cross domain-specific boundaries. For instance, a common library of <a href="#">XML</a> utilities should not have dependencies on another library that supports a specific <a href="#">domain</a> such as UHF satellites. However, the reverse is okay.
		<b>Examples</b>	None

## G1004

<b>Statement</b>	Make public <a href="#">interfaces</a> backward-compatible within the constraints of a published <a href="#">deprecation</a> policy.		
<b>Rationale</b>	The public interface is basically a contract between the <a href="#">producer</a> of the functionality defined in an interface and the <a href="#">consumer</a> of the functionality. These guidance statements are intended to ensure that this contract remains intact and that the consumer of the functionality is not broken during the update cycle of the interface.		
<b>Derived From</b>			
<b>Justifies</b>	<a href="#">[G1018]</a> , <a href="#">[G1019]</a> , <a href="#">[G1020]</a> , <a href="#">[G1208]</a>		
<b>Referenced By</b>	<a href="#">Publish and insulate public interfaces</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the public interface (interfaces that are used externally, outside the project's <a href="#">domain</a>) contain versioning information?</i>
		<b>Procedure</b>	Check to make sure the interface/class has versioning information.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Does the document structure contain a document that indicates the shelf life of deprecated interfaces?</i>
		<b>Procedure</b>	Note: This is a mandatory document  Check for project documents that have information on the life of deprecated interfaces.
		<b>Examples</b>	None

## G1005

### Statement

Separate [infrastructure](#) capabilities from [mission](#) functions.

### Rationale

Applications should not try to reinvent the wheel by creating custom [enterprise services](#) such as messaging, directory services, logging, etc. Application development should use standardized [APIs](#) to access common enterprise services. For instance, in Java, use [JMS](#) to access a messaging system.

### Derived From

### Justifies

### Referenced By

[Publish and insulate public interfaces](#)

### Acquisition Phase

Development

### Evaluation Criteria

- |    |                  |   |
|----|------------------|---|
| 1. | <b>Test</b>      | <i>Does the application re-create common and available enterprise services?</i>                   |
|    | <b>Procedure</b> | Check the application code for code that recreates functionality of an enterprise service.        |
|    | <b>Examples</b>  | None  |
| 2. | <b>Test</b>      | <i>Does the application code access enterprise services in a vendor-specific way?</i>             |
|    | <b>Procedure</b> | Check for code that accesses a vendor-specific API instead of utilizing an industry-standard API. |
|    | <b>Examples</b>  | None  |

## G1007

<b>Statement</b>	Ensure that applications use open, standardized, <a href="#">vendor-neutral API(s)</a>		
<b>Rationale</b>	Using standardized, open APIs will enable the code to be more portable. It will also prevent vendor lock-in. "Standardized" means industry consensus. "Open" means available to everyone.		
<b>Derived From</b>			
<b>Justifies</b>	<a href="#">[G1071]</a>		
<b>Referenced By</b>	<a href="#">Publish and insulate public interfaces</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application create customized/proprietary solutions where standardized API exists?</i>
		<b>Procedure</b>	Check the application for code that has proprietary solutions where standardized API exists. For instance, does the application write its own messaging system, bypassing utilizing the <a href="#">Java Messaging System</a> API.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Does the application utilize vendor-specific API?</i>
		<b>Procedure</b>	Check the application to make sure it is not using a vendor-specific API. For instance, see if the application accesses the database using a proprietary interface from Oracle instead of the standard <a href="#">JDBC</a> calls.
		<b>Examples</b>	None



## G1008

<b>Statement</b>	Isolate platform-specific <a href="#">interfaces</a> and <a href="#">vendor</a> dependencies.		
<b>Rationale</b>	Insulating platform-specific code using standard abstractions or custom classes will keep all non-portable code in one place and prevent proliferation of non-portable code throughout the application.		
<b>Derived From</b>			
<b>Justifies</b>	<a href="#">[G1073]</a>		
<b>Referenced By</b>	<a href="#">Publish and insulate public interfaces</a> , <a href="#">[G1118]</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application contain any platform-specific code that has not been abstracted?</i>
		<b>Procedure</b>	Check code that is non-portable. For instance, does the code use back slashes (Windows) or forward slashes (UNIX) in literal strings to create a path.  IE: String path = "\\tmp";
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Is platform-specific code isolated into a single class or file?</i>
		<b>Procedure</b>	Search the files for platform-specific code.
		<b>Examples</b>	None

## *G1010*

<b>Statement</b>	Use <a href="#">open-standards</a> logging frameworks.
<b>Rationale</b>	Standardizing on one logging <a href="#">API</a> means the code will be more portable between developers, and developers no longer need to learn multiple logging frameworks.
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[G1209]</a> , <a href="#">[G1210]</a>
<b>Referenced By</b>	<a href="#">Publish and insulate public interfaces</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel guidance.

# G1011

**Statement**

All components must be independently deployable.

**Rationale**

Independently deployable components do not have any dependencies on other components. This is often unattainable because components are often aggregations of lower-level components. Exceptions to this rule can occur if the relationships between components:

- Are well-defined and well thought out
- Are carefully managed
- Are externally configurable

**Derived From**
**Justifies**
**Referenced By**

[Implement a Component-Based Architecture](#)

**Acquisition Phase**

Development

**Evaluation Criteria**

- |    |                  |  |
|----|------------------|--|
| 1. | <b>Test</b>      | <i>Is the component dependent on other components?</i>   |
|    | <b>Procedure</b> | {Place the procedure to follow to evaluate the test question here. The procedure can be multiple steps } |
|    | <b>Examples</b>  | None   |

## G1012

**Statement**

Components should expose functionality through a set of services.

**Rationale**

By exposing discrete units of functionality as [services](#), business and data integrity remain intact. A service receives a request, processes it, and returns the result to the requester as a single operation.

**Derived From**
**Justifies**
**Referenced By**

[Implement a Component-Based Architecture](#)

**Acquisition  
Phase**

Development

**Evaluation  
Criteria**

- |    |                  |   |
|----|------------------|---|
| 1. | <b>Test</b>      | Are there <a href="#">WAR</a> files that contain the component? |
|    | <b>Procedure</b> | Check for the occurrence of <b>.war</b> files.                  |
|    | <b>Examples</b>  | None.   |
| 2. | <b>Test</b>      | Are there <a href="#">WSDL</a> files that define the services?  |
|    | <b>Procedure</b> | Check for the occurrence of <b>.wsdl</b> files.                 |
|    | <b>Examples</b>  | None.   |

## G1014

<b>Statement</b>	Access the database only through <a href="#">open-standards</a> interfaces to promote database independence.
<b>Rationale</b>	Standard <a href="#">API</a> (s) such as <a href="#">JDBC</a> or <a href="#">ODBC</a> promote database independence. However, even if you use a standard API, you can still write non-portable code if you use non- <a href="#">ANSI</a> -compliant <a href="#">SQL</a> . Using non-ANSI-compliant SQL causes vendor lock-in and makes <a href="#">interoperability</a> difficult.
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[G1211]</a> , <a href="#">[G1212]</a>
<b>Referenced By</b>	
<b>Acquisition Phase</b>	Decouple from Applications
<b>Evaluation Criteria</b>	See sublevel guidance to evaluate this guidance.

## G1018

<b>Statement</b>	Add version numbers/ identifiers to all public interfaces that will be shared between projects or groups.		
<b>Rationale</b>	Assigning versions is necessary when determining compatibility between the <a href="#">interface</a> and its <a href="#">consumer</a> . Versioning public interfaces allows all parties to track the evolution of the interface for backward compatibility. This can help consumers plan for integration and migration.		
<b>Derived From</b>	<a href="#">[G1004]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Ensure that version information can be identified. Does the code contain versioning information? It is important to have the version information in the shared public interface code because it identifies the actual interface that consumers of the interface will be coding to. Another benefit is that it allows tools to automatically generate the documentation so it does not need to be in two places.</i>
		<b>Procedure</b>	For Java, check for <b>@version</b> javadoc tag.  For other languages, and Java, check to see if the code is annotated using <a href="#">XML</a> tags or language-specific tags that support versioning.
		<b>Examples</b>	None

## G1019

<b>Statement</b>	Deprecate old versions of publicly shared interfaces and do not remove them until a specified time period has passed, as defined by the project document for deprecating obsolete interfaces.		
<b>Rationale</b>	By deprecating instead of removing interfaces, development teams can plan for software migration and continue to run the software with existing deprecated interfaces.		
<b>Derived From</b>	<a href="#">[G1004]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are old versions of public interfaces marked as deprecated?</i>
		<b>Procedure</b>	Check the SCM logs of public interface files to ensure that old interface functionality has not been removed.
		<b>Examples</b>	None

## *G1020*

<b>Statement</b>	A project must provide additional documents that describe plans and procedures that can be used to evaluate the project's compliance.
<b>Rationale</b>	To ensure a <a href="#">NESI</a> evaluation can be performed, these documents must be provided.
<b>Derived From</b>	<a href="#">[G1004]</a>
<b>Justifies</b>	<a href="#">[G1213]</a> , <a href="#">[G1214]</a> , <a href="#">[G1215]</a> , <a href="#">[G1216]</a>
<b>Referenced By</b>	<a href="#">Public Interface Design</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel guidance to evaluate this guidance



# G1021

## Statement

Create fully insulated classes.

## Rationale

Data members should not be public.

Do not expose implementation details of a class. For instance, information such as the use of a link list or **hashtable** in a class should not be exposed (i.e. made public).

Making implementation details public creates interdependencies between the class and its users, subjecting the users to changes in implementation. Therefore, access should only occur via public interface methods. This makes the implementation more robust, because all data can be validated when assigned new values or the changes can be logged.

## Derived From

## Justifies

## Referenced By

[Public Interface Design](#)

## Acquisition Phase

Development

## Evaluation Criteria

1. **Test** *Do instance variables have public access or are they more accessible than necessary?*
  - Procedure** Check that the instance variable in classes does not have public access unless it is static and final.
  - Examples** None
2. **Test** *Does the class provide direct access to internal data via pass by reference?*
  - Procedure** Check to make sure that the methods that access the internal state do not return a reference to the internal data.
  - Examples** None

## G1022

<b>Statement</b>	Insulate public <a href="#">interfaces</a> from compile-time dependencies.		
<b>Rationale</b>	<p>There are three distinct advantages to separating interface from implementation:</p> <p>Multiple interested parties (<a href="#">COIs</a>) can develop the interface and publish it to the user community ahead of any specific implementation. This allows groups to work independently and in parallel.</p> <ul style="list-style-type: none"> <li>• It prevents multiple copies of the defining interface. Duplicating the code for the interface in each implementation (library, jar, and assembly) makes it difficult to maintain, especially as the interface evolves.</li> <li>• It insulates developers from the constant changes in implementation.</li> </ul>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Publish and insulate public interfaces, Public Interface Design</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Is the packaging or deployment of the public interface self-contained and isolated to only the public interface(s)?</i>
		<b>Procedure</b>	Check to make sure that the jar, library, assembly, and <a href="#">WSDL</a> only contain the agreed-upon public interface (interfaces being shared externally).
		<b>Examples</b>	None
	2.	<b>Test</b>	<i>Does the container (jars, libraries, assemblies, WSDL) contain files other than the interface?</i>
		<b>Procedure</b>	Check to make sure the library does not include or rely upon any other files such as resource files, properties files, configuration files, other libraries, xml files, and so on that would force the repackaging of the public interface.
		<b>Examples</b>	None
	3.	<b>Test</b>	<i>Are there any outside influences that could affect the packaging of the public interface?</i>
		<b>Procedure</b>	Check the public interface for dependence on resource files, properties files, configuration files, XML files, and other libraries or packages.
		<b>Examples</b>	None

## G1027

**Statement**

All source code developed with DoD funding must be internally documented.

**Rationale**

Well-documented source code is easier to maintain and enhance over time. It is hard enough to get documentation about software and to keep it up to date. If the documentation is not internal to the source code, the chances that the software is current and up-to-date decreases. In recent years, the trend has been to generate external documentation about the software by processing the source code and comments (e.g., JavaDoc).

In addition to documenting the functionality of the source code, it is important to capture the configuration control information (e.g., CVS).

**Derived From**
**Justifies**
**Referenced By**

[Standard Interface Documentation](#)

**Acquisition Phase**

Development

**Evaluation Criteria**

1.     **Test**                   *Do all the source code files have a header that includes a statement protecting government rights to the source code and the right to change the source code?*
  - Procedure**           Scan each file and make sure the header includes a statement that protects the government's right to use, modify, and share the information with other government departments and agencies.
  - Examples**           None
2.     **Test**                   *Do all the source code files have a header that includes configuration information?*
  - Procedure**           Scan each file and make sure the header also includes configuration management information such as author, date created, and a history of modifications and versions.
  - Examples**           None
3.     **Test**                   *Do all the source code files have internal documentation for attributes, methods that can be processed by a computer?*
  - Procedure**           Scan the source files and make sure they are internally documented with tags such as JavaDoc or XML tags.
  - Examples**           None

## G1030

<b>Statement</b>	Use a standard GUI <a href="#">component</a> library.		
<b>Rationale</b>	<p>A predefined component library helps control cost and configuration. Licensing issues can be resolved before development begins, and component costs are minimized by avoiding library overlap.</p> <p>Now that component architecture is standard, it is possible to put together applications using a variety of components from multiple vendors. These components are bundled in third-party toolkits that vastly extend the range of options available in standard Windows or Java GUI toolkits. These toolkits are in common use and possess a wide variety of pre-built components. Almost all support common <a href="#">look-and-feel</a> (e.g., Windows or Java).</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Thick Clients</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the user interface code use any other toolkits besides a Standard GUI Toolkit?</i>
		<b>Procedure</b>	Check to make sure the thick-client code is developed using the Swing/AWT library in Java, and the standard, included Windows Toolkit In .NET.
		<b>Examples</b>	None

## G1031

**Statement** Architect applications to cleanly separate the presentation, business, and data layers.

**Rationale** This guidance applies to all application types, from thick-client standalone applications to distributed [web applications](#). Clean separation between presentation, business, and data layers will allow the application to be easier to maintain and more reusable.

**Derived From**

**Justifies**

**Referenced By**

**Acquisition Phase** Development

**Evaluation Criteria** 1. **Test**

*Presentation layer:*

*Check that the presentation layer does not access the data layer directly.*

Check the presentation layer for the presence of [business logic](#).

*Business layer:*

*Check to make sure the business does not contain any GUI code.*

*Make sure access to the data layer is insulated to data access interface.*

*Data layer:*

*Check to make sure the data layer does not contain GUI code.*

*Check to make sure the data layer does not contain business logic.*

**Procedure**

Presentation layer:

Check the presentation layer for [JDBC](#), [SQL](#), or [ODBC](#) code.

Make sure code such as specialized data processing algorithms, or code that manages workflow is not in the presentation tier.

Business layer:

Check the business layer to make sure it does not import GUI libraries or GUI components.

Make sure database code such as SQL and JDBC are isolated using Data Access Pattern; data tier code should

not proliferate throughout the middle tier.

Make sure Value Object Pattern is used for data transfer between the middle and data layer.

Data layer:

Make sure the data layer is not responsible for generating GUI code.

Make sure the data layer does not perform any business logic. Look for use of [stored procedures](#).

**Examples**

None

## G1032

<b>Statement</b>	Validate all input fields.		
<b>Rationale</b>	Errors should be detected as close to point-of-data-entry as possible. This greatly enhances the end-user experience and reduces frustration. This can be done by reducing the number of freeform text fields and using selection mechanisms such as radio buttons, option boxes, pull down lists, maps, calendars, clocks, slider bars, and other numeric validation entries.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Presentation Tier</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Do the GUI screens use non-freeform text entry fields?</i>
		<b>Procedure</b>	Scan the GUI code looking for the use of non-freeform text data entry mechanisms.
		<b>Examples</b>	None.

## G1035

<b>Statement</b>	Code must not deviate from <a href="#">W3C standards</a> or use vendor-specific add-on features.		
<b>Rationale</b>	Code cannot be browser-independent if vendor-specific add on features are used. Vendor-specific add-on features reduce the portability and <a href="#">interoperability</a> of the code. Vendor-specific <a href="#">API</a> (s) can cause vendor lock-in and in many cases can also cause version lock-in. Following the W3C standard avoids these problems.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">GUI Design</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the code adhere strictly to the W3C standards?</i>
		<b>Procedure</b>	Check to make sure there is no vendor-specific code.
		<b>Examples</b>	None



## G1043

<b>Statement</b>	Decouple the graphical style from the content format.		
<b>Rationale</b>	Makes it easy to change the style for the entire site.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">GUI Design</a> , <a href="#">Look Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	Do all web document <a href="#">HTML</a> , <a href="#">JSP</a> , <a href="#">ASP</a> , and <a href="#">CSS</a> follow the Disability Act guidelines?
		<b>Procedure</b>	Check to make sure all web documents follow the guidelines.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	Is the “align” attribute used in any of the HTML tags?
		<b>Procedure</b>	Search all web pages and make sure there are no “align” attributes in any tags.
		<b>Examples</b>	<p>Correct usage:            In a style sheet:  <code>h1{text-align:center;}</code></p> <p>Incorrect usage:            In a web page:  <code>&lt;h1 align="center"&gt;NESI&lt;/h1&gt;</code></p>

## G1044

<b>Statement</b>	Web documents shall comply with Disability Act guidelines.		
<b>Rationale</b>	<p>These guidelines benefit all communities of interest.</p> <p>For more information, see <a href="http://www.section508.gov">http://www.section508.gov</a></p> <p>or</p> <p><a href="http://www.w3.org/TR/WAI-WEBCONTENT/">http://www.w3.org/TR/WAI-WEBCONTENT/</a></p>		
<b>Derived From</b>			
<b>Justifies</b>	<a href="#">GUI Design</a>		
<b>Referenced By</b>	Development		
<b>Acquisition Phase</b>			
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	Do all web document <a href="#">HTML</a> , <a href="#">JSP</a> , <a href="#">ASP</a> , and <a href="#">CSS</a> follow the Disability Act guidelines?
		<b>Procedure</b>	<p>Check to make sure all web documents follow the guidelines.</p> <p>Use available validation tools to validate Section 508 accessibility and WAI accessibility. Go to <a href="http://www.contentquality.com/Default.asp">http://www.contentquality.com/Default.asp</a> to validate the page.</p>
		<b>Examples</b>	None

## G1045

<b>Statement</b>	Define <a href="#">XML</a> format information separately in <a href="#">XSL</a> .	
<b>Rationale</b>	XML documents should be free of any presentation information and should only contain data. Separating presentation data from content allows multiple presentations for the same content data.	
<b>Derived From</b>		
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">XML Rendering</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Check for presentation information in XML documents?</i>
	<b>Procedure</b>	Does the XML document contain only data? If the XML document is not an <a href="#">XSLT</a> document, does it contain presentation information?
	<b>Examples</b>	None

## G1049

<b>Statement</b>	Do not use <a href="#">ActiveX</a> controls.		
<b>Rationale</b>	Browser incompatibility poses serious security risk, because it does not run inside a sandbox. ActiveX controls are like <a href="#">applets</a> , except they are not restricted by a sandbox and can access client machine resources such as the hard disk directly. This makes them very dangerous.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Active Server Pages (ASP)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the ASP use any ActiveX controls?</i>
		<b>Procedure</b>	Check for Active X controls inside web pages.
		<b>Examples</b>	None

## G1050

<b>Statement</b>	In <a href="#">ASP</a> , isolate the presentation tier from the middle tier using <a href="#">COM</a> objects.	
<b>Rationale</b>	This is the best way to isolate the presentation tier from the middle tier in ASP.	
<b>Derived From</b>	<a href="#">[G1058]</a>	
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">Active Server Pages (ASP)</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Is all the middle tier code isolated from the presentation tier in ASP via COM?</i>
	<b>Procedure</b>	Verify that ASP files do not contain middle-tier code. Instead, this code should be in COM objects referenced from the ASP.
	<b>Examples</b>	None

## G1052

<b>Statement</b>	Use the code-behind feature in ASP.NET to separate presentation code from the business logic.		
<b>Rationale</b>	Separating presentation code from business logic allows the developers and content designers to work independently. It also makes the code more maintainable because changes in the design elements or business elements do not affect each other.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Active Server Pages for .NET (ASP.NET)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is there code in ASP pages?</i>
		<b>Procedure</b>	Check to make sure that ASP files have the code-behind attribute in the first line instead of embedded C# code in the ASP.
		<b>Examples</b>	None

## G1053

<b>Statement</b>	Do not embed HTML code in any <b>code-behind</b> code used by <b>aspx</b> pages.		
<b>Rationale</b>	Intermixing VB or C# or C++ with presentation code (HTML) makes the code unnecessarily difficult to maintain by both the developer and designer. This is similar in concept to Java's not embedding HTML code in <a href="#">servlets</a> .		
<b>Derived From</b>	<a href="#">[G1058]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Active Server Pages for .NET (ASP.NET)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Check for HTML code in code-behind code.</i>
		<b>Procedure</b>	Check the code-behind file ( <b>.aspx.vb</b> for example) for any HTML tags.
		<b>Examples</b>	None

## G1055

<b>Statement</b>	Use a fully qualified, registered <a href="#">namespace</a> with identity information for all custom controls.		
<b>Rationale</b>	<a href="#">.NET</a> allows users to create a custom control from a web page. This allows the custom web page to be reusable just like a GUI control. This feature is great; however, users must fully qualify their controls to prevent namespace collisions.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Active Server Pages for .NET (ASP.NET)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	Does the <a href="#">ASP</a> register its identity?
		<b>Procedure</b>	Check the <b>.aspx</b> file and make sure there is a statement to register the custom control. Look for something similar to
		<b>Examples</b>	None



## G1056

<b>Statement</b>	Specify a versioning policy for <a href="#">.NET</a> assemblies.		
<b>Rationale</b>	Versioning assemblies and configuring dependent assemblies allow the <a href="#">Common Language Runtime (CLR)</a> to load the proper assemblies at runtime for your application. This insulates the application from system configuration changes.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Active Server Pages for .NET (ASP.NET)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application assembly have versioning information?</i>
		<b>Procedure</b>	Check the application assembly manifest for versioning information.  Use the .NET configuration tool to check for versioning policy and versioning information.
		<b>Examples</b>	None

## G1058

<b>Statement</b>	Use the Model, View, Controller (MVC) pattern to decouple presentation code from other tiers.		
<b>Rationale</b>	<p>Separating data-layer code from presentation-layer code provides the ability to base multiple views on the same model. This is especially important in the enterprise model because often, the user interface varies with the device (browser, mobile phone, thick client, etc.).</p> <p>Isolating different layers allows changes to occur in each layer without impacting other layers. For instance, if the data layer (model) decides to switch databases, the changes are isolated to the data layer and do not affect the view layer or controller layer.</p> <p>Lastly, because MVC architecture enforces separation between presentation, processing, and data layer, this allows functionality to be loosely coupled and therefore more suited for reuse.</p>		
<b>Derived From</b>			
<b>Justifies</b>	<a href="#">[G1050]</a> , <a href="#">[G1053]</a>		
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application use a Model 2 (MVC) pattern?</i>
		<b>Procedure</b>	<p>Check to see if all requests are being mapped to a single controller servlet.</p> <p>Check that all page rendering are being done by a <a href="#">JSP</a> and not a <a href="#">servlet</a>.</p>
	<b>2.</b>	<b>Test</b>	<i>Does the application enforce clear separation between data layer (model), presentation layer (view), and middle/business layer (controller)?</i>
		<b>Procedure</b>	<p>Check to make sure the application presentation is not accessing the database directly.</p> <p>Check to make sure the application data layer (model) is not implementing business logic (store procedures).</p> <p>Check to make sure the middle/business layer (controller) does not contain presentation code. For example, make sure servlets do not generate HTML.</p> <p>Make sure access to the database is isolated to Data Access Object instead of proliferated throughout the middle layer.</p>
		<b>Examples</b>	None

## G1060

<b>Statement</b>	Encapsulate Java code that is used in <a href="#">JSP</a> (s) in tag libraries.		
<b>Rationale</b>	Separating code from presentation allows developers and designers to work independently. It makes the code reusable and more maintainable because it is defined in a tag library.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Java Server Pages (JSP)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Do the JSP pages use tag libraries?</i>
		<b>Procedure</b>	Look through the JSP pages for embedded Java source code.
		<b>Examples</b>	None

## G1071

<b>Statement</b>	Connections to the enterprise (e.g., <a href="#">LDAP</a> , <a href="#">JNDI</a> , <a href="#">JMS</a> , databases) should use vendor-neutral interfaces.		
<b>Rationale</b>	Increases <a href="#">portability</a> and maintainability. Many of the newer connection mechanisms are vendor-neutral. Use these instead of isolation design patterns or vendor-specific connection mechanisms.		
<b>Derived From</b>	<a href="#">[G1007]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">[G1239]</a> , <a href="#">Java Naming &amp; Directory Interface (JNDI)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is the connection mechanism vendor-neutral?</i>
		<b>Procedure</b>	Examine the source code for vendor-specific imports or includes. Make sure only standard APIs are used.
		<b>Examples</b>	None

## G1073

<b>Statement</b>	Isolate vendor extensions to enterprise-services standard interfaces.		
<b>Rationale</b>	Vendor extensions are convenient, but help create "vendor lock" and reduce vendor neutrality and migration. It is best to avoid these extensions altogether. If that is not possible, then isolate them in an <a href="#">adapter</a> or a wrapper-like construct.		
<b>Derived From</b>	<a href="#">[G1008]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are vendor extensions to enterprise services used?</i>
		<b>Procedure</b>	Make sure that no vendor-specific code is included or imported except as part of an adapter or wrapper.
		<b>Examples</b>	None

## G1078

<b>Statement</b>	Document the use of non-J2EE-defined <a href="#">deployment descriptors</a>		
<b>Rationale</b>	Deployment descriptors that are not defined by the J2EE specification are not portable between <a href="#">application servers</a> . For example, BEA WebLogic has a vendor-specific deployment descriptor called <b>weblogic-ejb-jar.xml</b> and JBoss has a vendor specific deployment descriptor called <b>jboss-jar.xml</b> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">J2EE environment</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are all the XML files that are not part of the J2EE specification identified in a delivered document?</i>
		<b>Procedure</b>	<p>Search all XML documents in the META-INF and WEB-INF directories and identify any XML files that are not defined by J2EE. These files should be found in a README or other delivered file that describes their purpose.</p> <p>Web application</p> <p><code>WEB-INF/web.xml</code></p> <p>EJB JAR</p> <p><code>META-INF/ejb-jar.xml</code></p> <p>J2EE Connector</p> <p><code>META-INF/ra.xml</code></p> <p>Client application</p> <p><code>META-INF/application-client.xml</code></p> <p>Enterprise application</p> <p><code>META-INF/application.xml</code></p>
		<b>Examples</b>	None

## G1079

<b>Statement</b>	<a href="#">J2EE</a> applications should isolate tailorable data values into the <a href="#">deployment descriptor</a> .
<b>Rationale</b>	Do not hard-code tailorable data into source files. The standard location for tailorable data for J2EE applications is in deployment descriptors. Developers should not reinvent the wheel of creating a non-standard mechanism for retrieving configurable data. Tailorable data is made accessible through application contexts that are provided by the application <a href="#">container</a> (J2EE <a href="#">application server</a> ).
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[G1200]</a> , <a href="#">[G1201]</a>
<b>Referenced By</b>	<a href="#">J2EE environment</a> , <a href="#">Java Naming &amp; Directory Interface (JNDI)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See the evaluation criteria for the guidance statements that this guidance statement justifies.

## G1080

<b>Statement</b>	<a href="#">Web-service</a> environments should adhere to the <a href="#">Web Services Interoperability Organization (WS-I)</a> standards for Basic Profile.	
<b>Rationale</b>	<p>Most of the <a href="#">COTS</a> web service products have already met this requirement. This is intended to cause a rejection of the non-standard web server.</p> <p>The WS-I standards for Basic Profile can be found at <a href="#">WS-I Org Basic Profile</a> and at the Microsoft site, <a href="#">Microsoft Basic Profile</a>.</p>	
<b>Derived From</b>		
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">WS-I Compliance</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1.</b>	<p><b>Test</b> <i>Is the web service product WS-I compliant?</i></p> <p><b>Procedure</b> Identify the web-service product being used, and verify through a literature search that it is WS-I compliant.</p> <p><b>Examples</b> None</p>



## G1082

<b>Statement</b>	Use the document literal style for all data transferred using <a href="#">SOAP</a> where the document is a <a href="#">W3C Organization's Document Object Model (DOM)</a> .		
<b>Rationale</b>	The document literal style requires that the input and output parameters to a web service be defined as W3 Organization Documents that follow the Document Object Model (DOM). The DOM acts as a contract between the <a href="#">producer</a> and the <a href="#">consumer</a> of the web service that is formal, well-defined, and rigorous. By validating the DOM against an <a href="#">XML</a> Schema Definition ( <a href="#">XSD</a> ), any discrepancies in the interface can be resolved.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">SOAP (Middle Tier)</a> , <a href="#">WS-I Compliance</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	Does the <a href="#">WSDL</a> define input, output, or returned parameters as W3 Organization Documents that follow the Document Object Model (DOM)?
		<b>Procedure</b>	Review all WSDL files used to describe a web service, and make sure they only pass documents. Document types should be <b>xsd:anyType</b> .
		<b>Examples</b>	None

## G1083

<b>Statement</b>	Do not pass <a href="#">Web Services Interoperability Organization's (WS-I) Document Object Model (DOM)</a> documents as strings.		
<b>Rationale</b>	Because of the relative simplicity of converting an <a href="#">XML</a> document to a string, it is easy to pass an entire document as a string rather than as an XML document. This can cause problems if the document contains tags that are similar to the tags used in the <a href="#">SOAP</a> . Passing it as an XML document ensures that the document is treated as a single entity.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">WS-I Compliance</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the <a href="#">WSDL</a> define input, output, or returned parameters as strings?</i>
		<b>Procedure</b>	Review all the WSDL files used to describe a web service and make sure that they only pass documents, not strings. Document types should be <b>xsd:anyType</b> .
		<b>Examples</b>	None

## G1084

<b>Statement:</b>	Documents transferred using <a href="#">SOAP</a> should be validated against the <a href="#">WC3 XML Standard 1.0</a> by a <a href="#">XML Schema Definition (XSD)</a> defined by the <a href="#">Community of Interest (COI)</a> .		
<b>Rationale:</b>	<p>Numerous <a href="#">COIs</a> are defining data that is specific to their needs. Many are capturing the data exchange requirements through <a href="#">XML schemas</a>. <a href="#">COI</a> information services definitions identify the schema appropriate. <a href="#">SOAP</a> web service implementations per the <a href="#">COI</a> should be faithful to these requirements. Use of <a href="#">COI</a> schemas will minimize the risk to interoperability.</p> <p>For example, the Joint Air and Missile Defense (JAMD) <a href="#">COI</a> is working in accordance with the DoD Network Centric Data Strategy.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Data Overview</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">SOAP</a> , <a href="#">WSDL</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program adopted <a href="#">COI</a> (community of Interest) data schemas?</i>
		<b>Procedure:</b>	Check <a href="#">DoD Metadata Registry</a> for the <a href="#">COI</a> schemas to compare to program <a href="#">WSDL</a> references. Check code for validation processing.
		<b>Examples:</b>	None

## G1085

**Statement:** All DoD Programs should be assigned a [registered namespace](#) in the [XML Gallery](#) in the [DoD Metadata Registry](#).

**Rationale:** The assignation of a unique [registered namespace](#) permits a project to be uniquely identified and categorized which avoids name collisions and conflicts. The DoD's Net-Centric Data Strategy requires that data products be stored in shared spaces to provide access to all authorized users and that these data products be tagged with [metadata](#) to enable discovery of data by authorized users. The use of a unique [registered namespace](#) provides an absolute identifier to products associated with a particular product and is an [XSD](#) schema requirement.

**Derived From**

**Justifies**

**Referenced By** [Data Overview](#), [WSDL](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Check the [DoD Metadata Registry](#) for the program assigned namespace?*

**Procedure:** Check [DoD Metadata Registry](#) to determine whether program is associated with [COI](#) (s).

**Examples:** None

# G1086

**Statement** All published [WSDL \(Web Services Definition Language\)](#) files should use a method of defining the Document Literal style for parameters that is interoperable across [web service vendors](#).

**Rationale** There are subtle differences between the ways web-service vendors handle the document literal style. The method in which they define the Document Literal style within the WSDL can introduce incompatibilities that cause problems during ports between vendors.

**Derived From**

**Justifies**

**Referenced By** [WSDL](#)

**Acquisition Phase** Development

**Evaluation Criteria** 1. **Test** *Are all the types used to pass documents into and out of the web service **xsd:anyType**?*

**Procedure** Examine the WSDL file input parameters and return the parameters' element type to make sure they are defined as **xsd:anyType**.

**Examples** The Axis WSDL code snippet below is an example of how to resolve interoperability issues. It modifies the WSDL file schema definition section and changes the argument element type to **xsd:anyType**.

```
<!-- WSDL snippet from Axis for Document Literal
Style. ◇
<wsdl:types>
<schema
<!-- . . . Some code removed for brevity ◇
<element
  name="in0"
  type=" apachesoap:Document"/>
<element
  name="getCelestialInfoReturn"
  type=" apachesoap:Document"/>
</schema>
</wsdl:types>
<!-- WSDL snippet from Axis for Document Literal
Style. ◇
<wsdl:types>
<schema
<!-- . . . some code removed for brevity ◇
<element
  name="in0"
  type="xsd:anyType"/>
<element
  name="getCelestialInfoReturn"
  type=" xsd:anyType"/>
</schema>
```

2. **Test** Are [XML](#) documents passed as strings?

**Procedure** Examine the code or the [SOAP](#) message to ensure the the document is not passed as a string.

**Examples** Passing the result of a report as a string (INCORRECT):

```
<soapenv:Body>
<getCelestialInfoReturn
```

```

xmlns="urn:CelestialInfoDocDoc"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xsi:type="xsd:String">
<CelestialInfoRpt xmlns="">
  <description>
    DOC-DOC: Results returned from :
    Softology01 (192.168.2.4)
  </description>
  <moonrise>2004-07-12 1:59 AM
PDT</moonrise>
  <moonset>2004-07-12 4:22 PM
PDT</moonset>
  <sunrise>2004-07-12 5:50 AM
PDT</sunrise>
  <sunset>2004-07-12 7:58 PM
PDT</sunset>
</CelestialInfoRpt>
</getCelestialInfoReturn>
</soapenv:Body>

```

Passing the result of a report as XML (CORRECT):

```

<soapenv:Body>
<getCelestialInfoReturn
  xmlns="urn:CelestialInfoDocDoc"
  xmlns:ns1="http://xml.apache.org/xml-soap"
  xsi:type="ns1:Document">
  <CelestialInfoRpt xmlns="">
    <description>
      DOC-DOC: Results returned from :
      Softology01 (192.168.2.4)
    </description>
    <moonrise>2004-07-12 1:59 AM PDT</moonrise>
    <moonset>2004-07-12 4:22 PM PDT</moonset>
    <sunrise>2004-07-12 5:50 AM PDT</sunrise>
    <sunset>2004-07-12 7:58 PM PDT</sunset>
  </CelestialInfoRpt>
</getCelestialInfoReturn>
</soapenv:Body>

```

## G1087

<b>Statement</b>	Validate all <a href="#">WSDL</a> ( <a href="#">Web Services Definition Language</a> ) files that describe <a href="#">web services</a> .		
<b>Rationale</b>	<p>Manually editing a <a href="#">WSDL</a> file is error-prone, work-intensive, and hard to maintain. However, if the user wants to do it, there is no way to detect a manually edited file from one that was auto generated. The important thing is not how the <a href="#">WSDL</a> file is generated but rather that the <a href="#">WSDL</a> file is valid. It must be validated with a <a href="#">WSDL</a> validator.</p> <p>Note: Not all <a href="#">WSDL</a> files that are generated and valid are necessarily interoperable.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Web Services</a> , <a href="#">WSDL</a> , <a href="#">Insulation and Structure</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Can the <a href="#">WSDL</a> file be validated?</i>
		<b>Procedure</b>	<p>Download a validation tool and test WSDL files.</p> <p>Tool at ws-i.org:  <a href="http://www.ws-i.org/deliverables/workinggroup.aspx?wg=testingtools">http://www.ws-i.org/deliverables/workinggroup.aspx?wg=testingtools</a></p> <p>Tool at eclipse.org:  <a href="http://dev.eclipse.org/viewcvs/indextech.cgi/wsvt-home/main.html?rev=1.20">http://dev.eclipse.org/viewcvs/indextech.cgi/wsvt-home/main.html?rev=1.20</a></p> <p>Tool at xMethods.net:  <a href="http://xmethods.net/ve2/Tools.po">http://xmethods.net/ve2/Tools.po</a></p> <p>Tool at pocketsoap.com:  <a href="http://pocketsoap.com/wsdl/">http://pocketsoap.com/wsdl/</a></p>
		<b>Examples</b>	None

## G1088

<b>Statement</b>	Use isolation design patterns such as <a href="#">façade</a> , <a href="#">proxy</a> , or <a href="#">adapter</a> to isolate the application from the connection and manipulation of <a href="#">SOAP messages</a> .		
<b>Rationale</b>	Insulating web-services (network)-specific code using standard abstractions such as a proxy object or an adapter will insulate the application from changes in web-service code and make the code easier to maintain, because it is centrally located.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Web Services</a> , <a href="#">SOAP (Middle Tier)</a> , <a href="#">Insulation and Structure</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are web service calls inside of the application code?</i>
		<b>Procedure</b>	Check for proliferation of web service calls inside an application.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Are web service calls isolated in a single adapter or proxy object?</i>
		<b>Procedure</b>	Check to see if all web service calls are isolated to a single adapter or proxy object.
		<b>Examples</b>	None
	<b>3.</b>	<b>Test</b>	<i>Are SOAP-client calls inside the application code?</i>
		<b>Procedure</b>	Check to see if SOAP-client code is proliferated inside the application code?
		<b>Examples</b>	None



# G1090

<b>Statement</b>	Do not hard-code a <a href="#">web service's endpoint</a> .		
<b>Rationale</b>	<p>This causes unnecessary dependencies between the client code and the web service that it uses.</p> <p>Sometimes hard-coding may be unavoidable. For example, many tools provided by web service vendor's hard-code the web service's URL in the generated client-side helper classes.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Web Services</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are there any hard-coded URLs in the client-side code?</i>
		<b>Procedure</b>	Parse the client code looking for hard-coded URLs.
		<b>Examples</b>	<p>The Java code samples below illustrate how this might be done. The first sample shows parameters that are hard-coded; the second sample shows how parameters and web-service endpoints are insulated.</p> <p>1. Hard-coded parameters:</p> <pre>// Sample code that has hard-coded parameters // before applying insulation public static void main ( String[] args ) throws Exception { //The SOAP endpoint String sSoapEndpoint = "http://live.capescience.com:80" + "/ccx/AirportWeather"; AirportWeatherClient myProxy = null; try { myProxy = AirportWeatherClientFactory.create ( sSoapEndpoint); System.out.println ("Location: " + myProxy.getLocation(args[0]) ); //rest of code removed for brevity } // End try Catch ( Exception exception ) { System.out.println("Error: " + exception); } // End catch };//end of main program</pre> <p>2. Insulated parameters and web-service endpoints</p> <p>a. Property file - this code shows the property file itself:</p> <pre>/* Property file: property.dat */ targetUrl=http://198.253.106.75/</pre> <p>b. Proxy sample code</p> <pre>// Sample code that has parameters and // web service connection through helper // methods after applying insulation</pre>

```

public interface airportWeatherProxy
{ public abstract String getLocation();
  // other public API's removed for brevity
} // End airportWeatherProxy

```

c. Client sample code:

```

import java.io.*;
import java.rmi.*;
import java.util.*;
import AirportWeatherClient; // auto-generated
SOAP
                                // client from IDE
*/
public class WeatherProxy
    implements airportWeatherProxy
{
    //
    //code removed for brevity
    //
    public WeatherProxy
        ( String propFileStr )
    { try
      { getEndPoint(propFileStr);
      } // End try
      catch(Exception e)
      { // Handle exception here
      } // End catch
      connect2SOAP();
    } // End constructor
    /* public api's */
    public String getLocation()
    { return location;
    } // End getLocation
    . . . // Other public API's removed for
    brevity
    private void getEndPoint
        ( String propsFile )
        throws Exception
    { if ( propsFile == null || propsFile.length()
    == 0 )
      { throw new Exception
        ( "SOAP EndPoint parameter not
    defined");
      } // End if
      props = new Properties();
      try
      { InputStream is = new
    FileInputStream(propsFile);
        props.load(is);
        is.close();
      } // End try
      catch ( Exception exception )
      { throw new Exception
        ( "can't read props file " +
    propsFile);
      } // End catch
      Enumeration enum = props.propertyNames();
      while ( enum.hasMoreElements() )
      { String endPointString = null;
        String propName =
    enum.nextElement().toString();
        if ( propName.equals ( endPointString ) )
        { soapEndpoint = props.getProperty(
    propName );
          break;
        } // end if
      } // End while
    } //end getEndPoint
    private void connect2SOAP()
    { try
      { myProxy

```

```

        = AirportWeatherClientFactory.create
          ( soapEndpoint );
        . . . //code removed for brevity
    } // End try
    catch ( Exception exception )
    { System.out.println
      ( "Error connecting to SOAP server: "
        + exception
      );
    } // End catch
} // End connect2SOAP
private Properties props = null;
private String propsFile = null;
private AirportWeatherClient myProxy = null;
private String soapEndpoint = null;
private String location = null;
} //end WeatherProxy
public class Weather
{ private static WeatherProxy myWeatherProxy =
  null;
  public static void main
    ( String[] args
    ) throws Exception
  { try
    { myWeatherProxy = new WeatherProxy (
args[0] );
    } // End try
    Catch ( Exception exception )
    { throw new Exception
      ( "can't connect to SOAP server");
    } // End catch
    System.out.println
      ( "Location: "
        + myWeatherProxy.getLocation()
      );
    . . . //code deleted for brevity
  } //end main
} //end Weather

```

## *G1091*

<b>Statement</b>	Do not hard-code <a href="#">web service vendor</a> specifics.
<b>Rationale</b>	Some web-service vendors add dependencies to their products and services, which can reduce <a href="#">portability</a> and increase the cost of porting to other web-service vendors.
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[G1236]</a> , <a href="#">[G1237]</a>
<b>Referenced By</b>	<a href="#">Insulation and Structure</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel guidance to evaluate this guidance.

## G1093

<b>Statement</b>	<a href="#">Web services</a> must handle <a href="#">SOAP</a> exceptions and <a href="#">SOAP</a> faults.		
<b>Rationale</b>	SOAP exceptions are raised when there are connective problems or violations in the SOAP protocol between the client and the server.		
<b>Derived From</b>			
<b>Justifies</b>	<a href="#">[G1095]</a>		
<b>Referenced By</b>	<a href="#">Web Services</a> , <a href="#">Error Handling</a> , <a href="#">SOAP</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the web application client have exception handlers for <b>SOAPExceptions</b>?</i>
		<b>Procedure</b>	Check to see that the web application client has an exception block specifically for <b>SOAPException</b> .
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Does the web application client test the SOAP response for a fault?</i>
		<b>Procedure</b>	Verify the web application client handles a true value returned from the <b>response.generatedFault</b> method.
		<b>Examples</b>	None

## G1094

<b>Statement</b>	Application code exposed as a <a href="#">web service</a> should catch all exceptions.		
<b>Rationale</b>	Any exception can reveal system internals and thus compromise security. Also, internal exceptions are not user friendly.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Error Handling</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does each exposed web method catch all possible exceptions and re-throw a declared application exception?</i>
		<b>Procedure</b>	Verify that each exposed web method has an exception block that catches all possible exceptions and then re-throws them as a declared application exceptions.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Does each exposed web method catch all possible runtime exceptions and re-throw a declared application runtime exception?</i>
		<b>Procedure</b>	Verify that each exposed web method has an exception block that catches all possible exceptions and then re-throws them as a declared application exceptions.
		<b>Examples</b>	None

## G1095

<b>Statement</b>	Use <a href="#">W3C</a> fault codes for all <a href="#">SOAP</a> faults.	
<b>Rationale</b>	Having predefined and accepted fault codes allows consumers to handle SOAP faults appropriately without prior knowledge of custom fault codes.	
<b>Derived From</b>	<a href="#">[G1093]</a>	
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">Web Services</a> , <a href="#">Error Handling</a> , <a href="#">SOAP</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Does the web application throw fault codes from the accepted list of fault codes?</i>
	<b>Procedure</b>	Verify that each fault code thrown by the web application is from the accepted list of SOAP fault codes defined by the W3C.
	<b>Examples</b>	None

## G1101

<b>Statement</b>	Use <a href="#">web services</a> to bridge <a href="#">J2EE</a> and <a href="#">.NET</a> .	
<b>Rationale</b>	<p>The easiest and best way to bridge J2EE and .NET is to define a web service.</p> <p>There are other ways to bridge J2EE and .NET using <a href="#">COTS</a> products. If used, these should follow the <a href="#">ANSI</a> Abstract Syntax Notation One (ASN.1) standard <a href="http://asn1.elibel.tm.fr/en/standards/index.htm#asn1">http://asn1.elibel.tm.fr/en/standards/index.htm#asn1</a>.</p> <p>ASN.1 is a formal notation for describing data transmitted by telecommunications protocols. It applies regardless of language implementation, physical representation of this data, application, and degree of complexity. (<a href="http://asn1.elibel.tm.fr/en/introduction/index.htm">http://asn1.elibel.tm.fr/en/introduction/index.htm</a>).</p>	
<b>Derived From</b>		
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">.NET Framework</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1.</b>	<p><b>Test</b> <i>Are Java and .NET files in the project?</i></p> <p><b>Procedure</b> Look for files with the .java, .class, .obj, .cs, .cc, or .c extensions existing with the source code.</p> <p><b>Examples</b> None</p>



## G1117

<b>Statement</b>	Isolate topic and queue names by not hard-coding them in <a href="#">client</a> code.	
<b>Rationale</b>	Since topics and queues are vendor-specific, maintain portability by isolating the hard-coded topics and queues from the rest of the application. To do this, use helper classes or property files.	
<b>Derived From</b>		
<b>Justifies</b>	<a href="#">Message-based Applications</a>	
<b>Referenced By</b>		
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Does the client code use hard-coded topics and queues in unisolated places in the application?</i>
	<b>Procedure</b>	Verify that all occurrences of hard-coded topics and queues are in isolated locations within the source code.
	<b>Examples</b>	None

# G1118

## Statement

Localize [CORBA](#)-vendor-specific source code into separate modules.

## Rationale

The general guidance is to minimize CORBA vendor-specific source code, while recognizing that vendor-specific features are necessary in certain circumstances. However, isolating vendor-specific code reduces maintenance effort.

Vendor capabilities tend to change more rapidly than CORBA-standard specifications. Experience shows that vendor updates frequently require modification to application source code, due to changing vendor interface conventions. These modifications impose vendor-version-specific constraints on the application, thereby complicating maintenance.

---

## Example

### Encapsulating CORBA ORB operations

The following examples show how to encapsulate binding operations for a C++ [ORB](#), and naming service operations for a Java ORB.

#### C++ ORB binder template

The code below shows a sample template for binding to the C++ ORB. IONA's ORBIX was used in this example.

```
/* =====
ServerBinder.h (Template)
this is a generic binder to ORBIX
===== */
#ifdef _BINDER_H_
#define _BINDER_H_
#ifdef IOSTREAM_H
#define IOSTREAM_H
#include <iostream.h>
#endif
#ifdef STDLIB_H
#define STDLIB_H
#include <stdlib.h>
#endif
template <class SERVERNAME, class VARPTR>
class Binder
{ private:
    char* serverName;
public:
    Binder(char* svName):serverName(svName){};
    ~Binder(){};
    int bind( VARPTR* p)
    { int attempts = 0, success = 0;
      int maxtries = 5, retval = 0;
      while ( ( attempts < maxtries )
              && (!success)
            )
      { ++attempts;
        cout << "Binding to server, attempt "
              << attempts
              << endl;
        try
        { (*p) = SERVERNAME::_bind();
          cout << "Bound to server"
                << endl;
          success = retval = 1;
        } // End try
        catch ( CORBA::SystemException &systemException )
        { cout << "SystemException, ServerBinder::bind"
```

```

        << endl
        << systemException;
        success = 1;
        retval = 0;
    } // End catch SystemException
    catch (...)
    { cout << "unknown Exception, ServerBinder::bind"
      << endl;
        success = 1;
        retval = 0;
    } // End catch all
    } //end while
    return retval;
} //end bind
} //end Binder
#endif

```

### Ada ORB binder template for C++

The code below shows a C++ template for binding to an Ada ORB. ORBexpress was used in this example.

```

/* =====
ada_binder.h (Template)
this is a generic binder to ORBExpress
===== */
#ifndef _ADA_BINDER_H_
#define _ADA_BINDER_H_
#ifndef IOSTREAM_H
#define IOSTREAM_H
#include <iostream.h>
#endif
#ifndef STDLIB_H
#define STDLIB_H
#include <stdlib.h>
#endif
template <class SERVERNAME, class VARPTR >
class Ada_Binder
{ private:
    char* adaIorString;
public:
    Ada_Binder
        ( char* iorString )
        : adaIorString ( iorString )
    {};
    ~Ada_Binder(){};
    int bindToAda( VARPTR* p)
    { int attempts = 0, success = 0;
      int maxtries = 5, retval = 0;
      while ( ( attempts < maxtries)
        && (!success)
      )
      { ++attempts;
        cout << "Binding to server, attempt "
          << attempts
          << endl;
        try
        { cout <<"adaIorString:"
          << endl
          << adaIorString
          << endl;
          (*p) = SERVERNAME::_bind(adaIorString);
        //can't use string_to_object in this version
        //it kills the ada IOR
        //
        CORBA::Object_ptr myptr
        CORBA::Orbix.string_to_object
          ( adaIorString );
        //
        (*p) = SERVERNAME::_narrow(myptr);
        cout << "Bound to server" << endl;
        success = retval = 1;

```

```

    } // End try
    catch (CORBA::SystemException& systemException)
    { cout << "SystemException, "
      << "AdaServerBinder::bind"
      << endl
      << systemException;
      success = 1;
      retval = 0;
    } // End SystemException
    catch (...)
    { cout << "Unknown Exception, "
      << "AdaServerBinder::bind"
      << endl;
      success = 1;
      retval = 0;
    } // End catch all
  } // end while
  return retval;
} // end bind
} // end ADA_Binder
#endif

```

---

## Example

### Naming service operations for a Java ORB

#### Java helper class

This example is a helper class, **JavaNamingHelper.java**, that encapsulates CORBA naming service operations for all services to use. We used Java [JDK 1.4](#) ORB to create this example.

```

import java.util.*;
import org.omg.CORBA.*;
import org.omg.CORBA.ORB.*;
import org.omg.CORBA_2_3.ORB.*;
import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContext.*;
import org.omg.CosNaming.NamingContextPackage.*;
import CBRNSensors.JSLSCAD.*;
public class JavaNamingHelper
{ static NamingContext nameSvc = null;
  static org.omg.CORBA.Object objref = null;
  static JSLSCADSensor myCBRNSensor = null;
  static org.omg.CORBA.Object myobj = null;
  public JavaNamingHelper()
  {
  }
  private static void showNamingContext
    ( org.omg.CORBA.ORB myorb )
  {
  public static NamingContext getNamingSvc
    ( org.omg.CORBA.ORB lclorb,
      String nameSvcName
    )
  { NamingContext lclNameSvc = null;
    try
    { org.omg.CORBA.Object nameSvcObj
      = lclorb.resolve_initial_references
        ( "NameService" );
      // . . . other business logic removed
      // for brevity
    } // End try
    catch(org.omg.CORBA.COMM_FAILURE cf)
    { . . . // error code goes here
    } // End catch
    catch ( org.omg.CORBA.ORBPackage.InvalidName invalidName)
    { . . . // error code goes here
    }
  }
}

```

```

    } // End catch
    catch ( SystemException systemException )
    { . . . // error code goes here
    }
} // End getNamingSvc
public static org.omg.CORBA.Object getObjFromNameSvc
( org.omg.CORBA.ORB myorb,
  String targetSensorName
)
{ . . . // business logic goes here
} //end getObjFromNameSvc
public static int setObj2NameSvc
( org.omg.CORBA.ORB myorb,
  BasesSensor mySensor,
  String targetSensorName
)
{. . . // business logic goes here
} //end setObj2NameSvc
}; //end class JavaNamingHelper

```

### Java server implementation

The code below is a sample Java server implementation that uses the naming service helper class.

```

import java.io.*;
import java.util.*;
import org.omg.CORBA.*;
import org.omg.CORBA.ORB.*;
import org.omg.CORBA_2_3.ORB.*;
import org.omg.PortableServer.*;
import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContext.*;
import org.omg.CosNaming.NamingContextPackage.*;
class MyServer
{ public static Properties props;
  public static ORB myorb = null;
  public static NamingContext nameSvc = null;
  public static RootSensor mySensor = null;
  public static String propertyFilePath = null;
  public static final String MY_SENSOR_NAME = "MYSENSOR";
  static public void main(String[] args)
  { // handle arguments
    System.out.println(" CORBA Server starting...\n");
    try
    { // Initialize the ORB.
      myorb = ORB.init(args, props);
      //instantiate servant and create ref
      POA rootPOA
        = POAHelper.narrow(myorb.resolve_initial_references
          ("RootPOA" ));
      . . . // rest of initialization code goes here
    } // End try
    catch ( org.omg.CORBA.ORBPackage.InvalidName invalidName )
    { . . . //error code goes here
    } // End invalidName
    // other exception types to catch go here
    catch ( SystemException systemException)
    { System.err.println ( systemException );
    } // End systemException
    // naming service hookup
    JavaNamingHelper.setObj2NameSvc
      ( myorb,mySensor,
        MY_SENSOR_NAME
      );
    try
    { System.out.println(" Ready to service requests\n");
      myorb.run();
    } // End try
    catch(SystemException systemException)

```

```

        { System.err.println ( systemException );
        } // End catch systemException
    } // End static block
} // End MyServer

```

### Java client implementation

The code below is a sample client implementation that uses the naming service helper class.

```

import java.io.*;
import java.util.*;
import org.omg.CORBA.*;
import org.omg.CORBA.ORB.*;
import org.omg.PortableServer.*;
import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContext.*;
import org.omg.CosNaming.NamingContextPackage.*;
import CBRNSensors.*;
import CBRNSensors.JSLSCAD.*;
import CBRNSensors.JSLSCAD.Impl.*;
public class JSLSCADClient
{
    public static Properties props;
    public static ORB myorb = null;
    public static String mySensorStr = null;
    private static org.omg.CORBA.Object objref = null;
    // helper class to handle orb connections etc.
    private static void connectToOrb
    ( String args[] )
    {
        try
        {
            myorb = ORB.init(args,props);
        } // End try
        catch(SystemException systemException)
        {
            System.err.println
            ( systemException.toString() );
            return;
        } // End catch systemException
        System.out.println("get naming service\n");
        objref
            = JavaNamingHelper.getObjFromNameSvc
            ( myorb,
              mySensorStr
            );
        sensorObj
            = JSLSCADSensorHelper.narrow(objref);
        try
        {
            POA rootPOA
                = POAHelper.narrow(myorb.resolve_initial_references
                ( "RootPOA" ));
            rootPOA.the_POAManager().activate();
        } // End try
        catch(org.omg.CORBA.ORBPackage.InvalidName invalidName)
        {
            //error code here
        } // End catch InvalidName
        . . . // other exceptions that may be required
            // for the operations
        catch(SystemException systemException)
        {
            System.err.println
            ( "System Exception during ops");
            System.err.println
            ( systemException );
        } // End systemException
    } // End connectToOrb
    //helper method to handle orb specific issues
    private static void disconnectFromOrb()
    {
        . . . // business logic goes here
    } // End disconnectFromOrb
    public static void main
    ( String args[] )
    {
        // Initialize the ORB.
    }
}

```

```

System.out.println ( "Initializing the ORB\n" );
props = new Properties();
// load property values
// use helper methods
connectToOrb ( args );
try
{ . . . // client business logic goes here
} // End try
catch ( Exception exception )
{ . . . // Exception handling code goes here
} // End exception handler
disconnectFromOrb( );
} // end main
} // end client

```

**Derived From**[\[G1008\]](#)**Justifies**[\[G1202\]](#)**Referenced By**[CORBA](#)**Acquisition  
Phase**

Development

**Evaluation  
Criteria**

The following evaluation criteria relate to non-IDL compiler auto-generated code. Further, the criteria relate to modules which are not annotated to contain vendor-specific code.

- |           |                  |   |
|-----------|------------------|---|
| <b>1.</b> | <b>Test</b>      | <i>Does the module contain vendor names anywhere in code text?</i>                    |
|           | <b>Procedure</b> | Review the code looking for a service that can be used to obtain configuration.       |
|           | <b>Examples</b>  | None  |
| <b>2.</b> | <b>Test</b>      | <i>Are any non-CORBA compliant CORBA:: objects declared or defined in the module?</i> |
|           | <b>Procedure</b> | Review the code for a service that can be used to obtain configuration.               |
|           | <b>Examples</b>  | None  |

## G1119

<b>Statement</b>	Isolate user-modifiable configuration parameters from the <a href="#">CORBA</a> application source code.
<b>Rationale</b>	<p>Configuration parameters control the behavior of the CORBA <a href="#">ORB</a> service environment and client/service processes during startup, execution, and termination. This parameterization allows execution-time control modification without having to rebuild, reinstall, or redeploy.</p> <p>Configuration defines the state of the client-and-service environment throughout the lifetime of the processes involved. This relates to considerations such as the allocation of threading and resources, <a href="#">POA</a> policies, the instantiation of servants and their invocations, failure and security behavior, connection management, quality of service prioritization, and so forth. The point is that CORBA provides an extremely complex but flexible environment for distributed computing interaction. Consequently, the designer requires flexible guidance to handle this option-rich environment.</p> <p>Configuration processes and their related parameters fall into two categories. The first involves configuration matters, which are defined to be perpetually static by the system architecture. The second involves matters that are intended to be modifiable by users.</p> <p>The first category, immutable configuration settings, relates to fundamental underlying assumptions that are foundational for the implementation. These are matters for which no user modification is ever intended as it would lead to unspecified behavior. Consider the example of a service implementation that is programmed to be single threaded. In this case, multi-threading controls are irrelevant and multiple instantiation would lead to dangerous confusion. For immutable configuration parameters, localized and well-commented implementation in the application source code is appropriate.</p> <p>For user-modifiable configuration settings, there are two further by-design divisions. The first involves configuration settings that are intended to be accessible by distributed processes. The second involves host-specific settings which relate to resources locally available, for which remote access is not desired. These are discussed in the related sublevel guidance</p>
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[G1204]</a> , <a href="#">[G1205]</a>
<b>Referenced By</b>	<a href="#">CORBA</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel guidance to evaluate this guidance.



# G1121

## Statement

Do not modify [CORBA IDL](#) compiler auto-generated stubs and skeletons.

## Rationale

The purpose of the IDL auto-generated stub and skeleton files is to provide a source code facility/mechanism for the developer in a specific language to use the IDL-described object interface in that specific language. The internal content of these files changes with the application's IDL modification, with IDL compiler-environment configuration settings, and with vendor-product compiler and [ORB](#) upgrades. By design, these files are not intended to be modified by the application developer. Developer modification of any auto-generated stub or skeleton file will typically lead to very severe maintenance hazards and failed application rebuild results.

The stub files describe the language source-code interface from the client side. Their use involves including the client stub header in the application's call invocation code.

The skeleton files describe the language source code interface from the service implementation side. Their use involves including the skeleton header in the application's operator implementation code. Their use also requires developer modification of a renamed clone of the auto-generated skeleton body file. These techniques are described in every ORB vendor's programming reference manuals.

## Derived From

## Justifies

## Referenced By

[CORBA](#)

## Acquisition Phase

Development

## Evaluation Criteria

1. **Test** *Is any application code contained in the auto-generated code?*
- Procedure** Inspect the auto-generated file creation/modification dates to verify that no tampering occurred after the IDL compilation step in the build process.
- Examples** The following examples are all based upon a single CORBA IDL interface.

---

## Code

### MyIdlInterface.idl

```
interface MyIdlInterface
{
    readonly attribute string version;
    void stop();
    void start();
    string error();
}; // End MyIdlInterface
```

### ORBExpress compiler

The ORBExpress IDL compiler generates these files:

- **myIdlInterface.h** - Client-side stub header
- **myIdlInterface.cxx** - Client-side stub implementation
- **MyIdlInterface\_s.h** - Abstract servant header
- **MyIdlInterface\_s.cxx** - Abstract servant implementation
- **MyIdlInterface\_impl.h** - Server implementation header
- **MyIdlInterface\_impl.cxx** - Server implementation implementation

Note: The only files that should be edited are **MyIdlInterface\_impl.h** and **MyIdlInterface\_impl.cxx**. The IDL compiler checks for the existence of the implementation (i.e. **\_impl**) files and will not overwrite them.

### MyIdlInterface\_impl.cxx

```
// Generated for interface MyIdlInterface
// in myIdlInterface.idl
#include "MyIdlInterface_impl.h"
MyIdlInterface_impl::MyIdlInterface_impl
( PortableServer::POA* oe_poa,
  const char* oe_object_id
) : POA_MyIdlInterface
    ( oe_object_id,
      oe_poa
    )
{
    . . . // TO DO: add implementation code here
} // end constructor
MyIdlInterface_impl::MyIdlInterface_impl
( const MyIdlInterface_impl& obj )
: POA_MyIdlInterface(obj)
{
    . . . // TO DO: add implementation code here
} // End constructor
MyIdlInterface_impl::~MyIdlInterface_impl()
{
    . . . // TO DO: add implementation code here
} // End destructor
CORBA::Char* MyIdlInterface_impl::version
( CORBA::Environment& _env )
{
    return CORBA::string_dup(_version);
} // End version
void MyIdlInterface_impl::stop
( CORBA::Environment& _env )
{
    . . . // TO DO: add implementation code here
} // End stop
void MyIdlInterface_impl::start
( CORBA::Environment& _env )
{
    . . . // TO DO: add implementation code here
} // End start
CORBA::Char* MyIdlInterface_impl::error
( CORBA::Environment& _env )
{
    CORBA::Char* result;
    . . . // TO DO: add implementation code here
    return result;
} // End error
```

### Java JDK compiler

The Java JDK IDL compiler generates these files:

- **MyIdlInterface.java**
- **MyIdlInterfaceHelper.java**
- **MyIdlInterfaceHolder.java**
- **MyIdlInterfaceOperations.java**
- **MyIdlInterfacePOA.java**
- **\_MyIdlInterfaceStub.java**

Note: Do not edit any of these files. Place the server implementation code in a file that extends from `MyIdlInterfacePOA.java`. This isolates the ORB implementation and prevents subsequent IDL compilations from accidentally overwriting the files. The code for the auto-generated `MyIdlInterfacePOA.java` class and the implementation class appears below:

### **MyIdlInterfacePOA.java**

```
/**
 * MyIdlInterfacePOA.java .
 * Generated by the IDL-to-Java compiler
 * (portable), version "3.1"
 * from myIdlInterface.idl
 */
public abstract class MyIdlInterfacePOA
    extends org.omg.PortableServer.Servant
    implements MyIdlInterfaceOperations,

    org.omg.CORBA.portable.InvokeHandler
{ . . . // rest of the auto-generated code
  removed for brevity
} // End MyIdlInterfacePOA
```

### **MyIdlInterfaceImpl.java**

```
package myIdlImpl;
import org.omg.CORBA.*;
import org.omg.CORBA.ORB.*;
import org.omg.CORBA_2_3.ORB.*;
import org.omg.PortableServer.*;
public class MyIdlInterfaceImpl
    extends MyIdlInterfacePOA
{
    private String strVersion;
    private String errString;
    public String version ()
    { . . . // implementation code goes here
      return strVersion;
    } // End version
    public void stop ()
    { . . . // implementation code goes here
    } // End stop
    public void start ()
    { . . . // implementation code goes here
    } // End start
    public String error ()
    { . . . // implementation code goes here
      return errString;
    } // End error
} // End MyIdlInterfaceImpl
```

## G1123

<b>Statement</b>	Use the “Fat Operation Technique” in <a href="#">IDL</a> operator invocation.		
<b>Rationale</b>	<p>This reduces the CORBA messaging overhead. The performance cost of network CORBA messaging is determined by two factors: latency and marshaling rate. Call latency is the minimum cost of sending any message at all. The marshaling rate is determined by the sizes of sending and receiving parameters and of return values.</p> <p>In the situation of a large number of objects involving objects that hold a small amount of stat, the call latency cost far exceeds the marshalling costs. Taking advantage of this reality, the “Fat Operation Technique” involves constructing structure objects which hold an aggregation of related attributes, and using the resulting structures in operation invocation parameters and returns. This amounts to transferring a larger amount of information with each network transaction.</p> <p>For more information, see <a href="#">Advanced CORBA Programming with C++</a> by Henning &amp; Vinoski, 1999 Addison Wesley, Chapter 22.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">CORBA</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the IDL contain function calls which have structure objects that are passed as parameters or returned from operators?</i>
		<b>Procedure</b>	Inspect the IDL file and manually check for parameters or returns using objects defined as structures, and verify that they are passed from methods also declared in the IDL.
		<b>Examples</b>	<i>None</i>

## G1125

<b>Statement:</b>	Use the <a href="#">Department of Defense Metadata Specification (DDMS)</a> for standardized tags and taxonomies.
<b>Rationale:</b>	These standardized tags or Metacards will be developed, maintained, and placed under configuration as appropriate and will comply with the <a href="#">DDMS</a> and <a href="#">COI</a> guidance. These include specifications defining the tagging for security classification and dissemination control. See <a href="http://diides.ncr.disa.mil/mdregHomePage/mdregHome.portal">http://diides.ncr.disa.mil/mdregHomePage/mdregHome.portal</a> for the current <a href="#">DDMS</a> standards.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">WSDL</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Has the Program documented the <a href="#">DDMS</a> profile used for published data assets in accordance with <a href="#">COI</a> guidance?</i> </li> <li> <b>Procedure:</b> Check <a href="#">DoD Metadata Registry</a> to determine whether program is associated with <a href="#">COI</a> (s). </li> <li> <b>Examples:</b> None </li> </ol>

## G1127

<b>Statement</b>	Use <a href="#">OASIS UDDI</a> specification 2.0 or higher.		
<b>Rationale</b>	UDDI provides a registration for services, and UDDI 2.0 has become a standard method for publishing discovery services.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">UDDI</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are the web services registered in a UDDI registry?</i>
		<b>Procedure</b>	Verify the registration in the UDDI registry.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Is the registry UDDI 2.0 or higher?</i>
		<b>Procedure</b>	Determine if the particular UDDI registry is UDDI Version 2.0 or higher.
		<b>Examples</b>	None

## G1131

### Statement

All [UDDI](#) inquiries should use the standard [UDDI APIs](#).

### Rationale

There is a standard [API](#) that uses [SOAP](#) messages to communicate with the UDDI registry. To increase compatibility and portability, use this API exclusively.

### Derived From

### Justifies

### Referenced By

[UDDI](#)

### Acquisition Phase

Development

### Evaluation Criteria

1. **Test** *Are all the interfaces to the UDDI registry made using the UDDI standard API?*

### Procedure

The standard API for UDDI is SOAP based. Requests and responses are passed using [XML](#) documents. Test the traffic flow between the client and the UDDI registry for messages that are defined in the UDDI specification. Use standard libraries to send and receive the messages (e.g. JUDDI for Java).

Checking for the use of packages like JUDDI does not require the application to be running.

### Examples

The following is an example as provided in the UDDI API reference: [http://uddi.org/pubs/ProgrammersAPI-V2.04-Published-20020719.htm#\\_Toc25137712](http://uddi.org/pubs/ProgrammersAPI-V2.04-Published-20020719.htm#_Toc25137712).

---

## *find\_binding*

The **find\_binding** API call returns a **bindingDetail** message that contains zero or more **bindingTemplate** structures matching the criteria specified in the argument list.

### Syntax

```
<find_binding
  serviceKey="uuid_key"
  [maxRows="nn"] generic="2.0"
  xmlns="urn:uddi-org:api_v2" >
  [<findQualifiers/>]
  <tModelBag/>
</find_binding>
```

### Arguments

**serviceKey** This **uuid\_key** is used to specify a particular instance of a **businessService** element in the registered data. Only bindings in the specific **businessService** data identified by the **serviceKey** passed will

be searched.

<b>maxRows</b>	This optional integer value allows the requesting program to limit the number of results returned.
<b>findQualifiers</b>	This optional collection of <b>findQualifier</b> elements can be used to alter the default behavior of search functionality. See the <b>findQualifiers</b> appendix for more information.
<b>tModelBag</b>	This is a list of <b>tModel uuid_key</b> values that represents the technical fingerprint of a <b>bindingTemplate</b> structure contained within the <b>businessService</b> specified by the <b>serviceKey</b> value. Only <b>bindingTemplates</b> that contain all of the <b>tModel</b> keys specified will be returned (logical AND). The order of the keys in the <b>tModel</b> bag is not relevant.

## Returns

This API call returns a **bindingDetail** message upon success. In the event that no matches were located for the specified criteria, the **bindingDetail** structure returned will be empty (i.e., it contains no **bindingTemplate** data.) This signifies a zero match result. If no arguments are passed, a zero-match result set will be returned.

In the event of an overly large number of matches (as determined by each Operator Site), or if the number of matches exceeds the value of the **maxRows** attribute, the Operator site will truncate the result set. If this occurs, the response message will contain the truncated attribute with the value “true”.

## Caveats

If any error occurs in processing this API call, a **dispositionReport** element will be returned to the caller within a SOAP Fault. The following error number information will be relevant:

**E\_invalidKeyPassed** signifies that the **uuid\_key** value passed did not match with any known **serviceKey** or **tModelKey** values. The error structure will signify which condition occurred first, and the invalid key will be indicated clearly in text.



**E\_unsupported**

signifies that one of the **findQualifier** values passed was invalid. The invalid qualifier will be indicated clearly in text.

## G1132

<b>Statement</b>	Implement the data tier using readily available <a href="#">COTS RDBMS</a> products that implement the <a href="#">SQL</a> standard and provide a rich set of generic capabilities such as row-level locking, <a href="#">stored procedures</a> , <a href="#">triggers</a> , and a high-level language <a href="#">API</a> interface.		
<b>Rationale</b>	COTS RDBMSs are mature technical products, the capabilities of which are being continually expanded to adapt to and accommodate new technologies. Moreover, there is a large technical community able to develop and maintain data systems based on these products. It is likely that a COTS DBMS will provide all of the data tier capabilities required by the developer.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Database Implementations</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is the proposed COTS DBMS product a readily available and supportable COTS product that implements the SQL standard?</i>
		<b>Procedure</b>	Verify that the COTS DBMS product is widely in use in the DoD environment (e.g., Oracle, SqlServer, or DB2), has a large support community, and is likely to be supported for the lifecycle of the project.
		<b>Examples</b>	None

# G1141

<b>Statement</b>	Use standard <a href="#">data models</a> developed by <a href="#">Communities of Interest (COI)</a> as the basis of program or project <a href="#">data models</a> .		
<b>Rationale</b>	Standard <a href="#">data models</a> are under development in many areas of the DoD and will be stored in and made available from DoD <a href="#">metadata</a> repositories. The use of these models or portions thereof supports interoperability among applications. The <a href="#">C2IEDM data model</a> , which is used in the <a href="#">Command and Control</a> area, is an example of one of these standard <a href="#">data model</a> development efforts.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	Analysis, <a href="#">Database Development</a> , <a href="#">Data Modeling</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Have standard <a href="#">data models</a> been considered for use in the system?</i>
		<b>Procedure</b>	Determine whether standard DoD <a href="#">data models</a> exist for the technical areas accommodated in the system requirements. Verify that the <a href="#">data model</a> developed for the application accommodates the use of these <a href="#">data models</a> .
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>If the system is a command-and-control application, has preference been given to the use of the Command &amp; Control Information Exchange Data Model (<a href="#">C2IEDM</a>) rather than locally defined values?</i>
		<b>Procedure</b>	Examine the system <a href="#">data model</a> and verify that the <a href="#">C2IEDM data model</a> has been incorporated.
		<b>Examples</b>	None

## G1144

<b>Statement</b>	Develop a two-level database models: one level captures the <a href="#">conceptual</a> or logical aspects, and the other level captures the <a href="#">physical</a> aspects.		
<b>Rationale</b>	There are a number of modeling tools available that permit the development of Entity-Relationship diagrams. Developers can use these tools to create conceptual models that are independent of the <a href="#">DBMS</a> in which the system is implemented, and to develop the physical models that are translated directly into DDL (data definition language), the <a href="#">SQL</a> code used to create the database. Using a conceptual model permits implementation or reuse of a complex ERD on multiple <a href="#">DBMS</a> products.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Database Development, Family of Interoperable Operational Pictures (FIOP)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Has a separate <a href="#">conceptual</a> or <a href="#">physical</a> model been developed?</i>
		<b>Procedure</b>	Verify the presence of a conceptual or logical model.
		<b>Examples</b>	None

## G1146

<b>Statement</b>	The <a href="#">data models</a> should contain information necessary to generate a <a href="#">data dictionary</a> .		
<b>Rationale</b>	A <a href="#">data dictionary</a> is an integral part of every system including databases. A description of each data item and the units in which the contents are measured are essential. <a href="#">Data modeling</a> tools provide a mechanism for storing information necessary to produce a <a href="#">data dictionary</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Database Development</a> , <a href="#">Data Modeling</a> , <a href="#">Family of Interoperable, Operational Pictures (FIOP)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Has description information been included in the <a href="#">data model</a>?</i>
		<b>Procedure</b>	Examine the physical <a href="#">data model</a> .
		<b>Examples</b>	None

## G1147

**Statement**

[Domain analysis](#) should define the constraints on input data validation.

**Rationale**

[Domain analysis](#) is an integral part of any data system including databases. Domains describe the set or range of values that are acceptable for a specific data item. These include, at a minimum:

- Data type
- Precision
- Minimum
- Maximum
- Length

These values are used to validate the data.

In the database, the range checking is done via check constraints on the data item. These [check constraints](#) are generated from the [physical data model](#) as part of the DDL.

**Derived From**
**Justifies**
**Referenced By**

[Database Development](#), [Data Modeling](#) , [Family of Interoperable Operational Pictures \(FIOP\)](#)

**Acquisition Phase**

Development

**Evaluation Criteria**

- |    |                  |   |
|----|------------------|---|
| 1. | <b>Test</b>      | <i>Has domain analysis been included in the <a href="#">data model</a>?</i> |
|    | <b>Procedure</b> | Examine the <a href="#">physical data model</a> .                           |
|    | <b>Examples</b>  | None  |

# G1148

## Statement

[Normalize](#) the [data models](#).

## Rationale

[Normalization](#) is a central [tenet](#) of [relational database](#) theory. It also part of [OOA](#).

A database should usually be normalized to at least third normal form. Although there are seven normal forms, normalization beyond third normal form is rarely considered in practical database design.

Objects developed in the absence of data normalization are prone to unnecessary complexity required to keep multiply copies of data.

## Derived From

## Justifies

## Referenced By

[Database Development Data Modeling](#)

## Acquisition Phase

Development

## Evaluation Criteria

- |    |                  |   |
|----|------------------|---|
| 1. | <b>Test</b>      | <i>Is the database design in third normal form?</i>         |
|    | <b>Procedure</b> | Examine the conceptual/logical <a href="#">data model</a> . |
|    | <b>Examples</b>  | None  |

## G1151

<b>Statement</b>	Define declarative <a href="#">foreign keys</a> for all relationships between tables to enforce <a href="#">referential integrity</a> .		
<b>Rationale</b>	<a href="#">Foreign key</a> constraints enforce referential integrity. The principle of referential integrity requires that the foreign key values of a child table are either null or match exactly those of the <a href="#">primary key</a> in the parent table.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Have foreign-key constraints been incorporated into the database?</i>
		<b>Procedure</b>	Examine the database to determine whether foreign-key constraints have been included in the database creation scripts and created in the database.
		<b>Examples</b>	None



## G1153

<b>Statement:</b>	Support n-tier architectures for efficient and accurate maintenance operations.		
<b>Rationale:</b>	Modern software design methodologies call for the implementation of an n-tiered (including 2 tier) architecture. The separation of the presentation, business logic and data layers with well defined interfaces between each provide scalability, efficient maintenance and simplify development.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Family of Interoperable Operational Pictures (FIOP)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the system been designed and developed using a multi-tier architecture?</i>
		<b>Procedure:</b>	Verify that the system design accommodates a multi-tier architecture
		<b>Examples:</b>	None

G1154

Statement	Use <a href="#">stored procedures</a> for operations that are focused on the insertion and maintenance of data.		
Rationale	Current software design methodologies and architectures call for the implementation of an n-tiered architecture with business rules in the middle tier and data stored in a separate data tier. When multiple applications access a common database, however, the rules may be best located at the data-tier level. Otherwise, changes in one application would have to be coordinated across all applications. Thus their use to implement detailed <a href="#">business logic</a> and algorithms should be limited to enterprise databases used by multiple applications.		
Derived From			
Justifies			
Referenced By	<a href="#">RDBMS Internals</a>		
Acquisition Phase	Development		
Evaluation Criteria	1.	Test	<i>Are database triggers used?</i>
		Procedure	Check for stored procedures that are triggered on insertion, deletion, and update events.
		Examples	<pre>CREATE TRIGGER PersonCheckAge AFTER INSERT OR UPDATE OF age ON Person FOR EACH ROW BEGIN     IF (:new.age &lt; 0) THEN         RAISE_APPLICATION_ERROR             ( -20000,               'no negative age allowed'             );     END IF; END;</pre>

## G1155

<b>Statement</b>	Use <a href="#">triggers</a> to enforce <a href="#">referential</a> or <a href="#">data integrity</a> , not to perform complex <a href="#">business logic</a> .		
<b>Rationale</b>	Triggers are fired on events. Current software design methodologies and architectures call for the implementation of an n-tiered architecture with business rules in the middle tier and data stored in a separate data tier. Implementing business logic in triggers, as well as in the middle tier, violates this concept.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Has business logic been incorporated into database triggers?</i>
		<b>Procedure</b>	Examine the database trigger code to determine whether business logic or calls to stored procedures incorporating business logic have been coded into them.
		<b>Examples</b>	None

## ***G1190***

<b>Statement</b>	Use a build tool.
<b>Rationale</b>	A build tool allows for the encapsulation of building instructions into machine-readable files or sets of files. The instructions can be successfully and consistently repeated.
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[G1218]</a> , <a href="#">[G1219]</a> , <a href="#">[G1220]</a> , <a href="#">[G1221]</a> , <a href="#">[G1222]</a> , <a href="#">[G1223]</a> , <a href="#">[G1224]</a> , <a href="#">[G1225]</a>
<b>Referenced By</b>	<a href="#">Automate the Build Process</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel guidance to evaluate this guidance.

## G1200

<b>Statement</b>	Define all external resources by using a separate <b>resource-ref</b> element for each resource.		
<b>Rationale</b>	This allows the source code to look up a resource by a "virtual" name that is mapped to the actual <a href="#">JNDI</a> location at deployment time.		
<b>Derived From</b>	<a href="#">[G1079]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">J2EE environment, Java Naming &amp; Directory Interface (JNDI)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are there any resource references that are defined in the application code?</i>
		<b>Procedure</b>	Check the code for connect operations that do not use a JNDI lookup.
		<b>Examples</b>	None

## G1201

<b>Statement</b>	Define configuration data such as <a href="#">environment variables</a> , parameters, and properties by using <b>resource-env-ref</b> elements.		
<b>Rationale</b>	Configuration data is basically a name-value pair. This allows the tailoring of the application to different contexts without having to modify source code and consequently rebuild and retest.		
<b>Derived From</b>	<a href="#">[G1079]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">J2EE environment</a> , <a href="#">Java Naming &amp; Directory Interface (JNDI)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are there any environment variables that must be defined before the application can be run?</i>
		<b>Procedure</b>	Check OS startup scripts (e.g., <b>bat</b> , <b>cmd</b> , <b>csch</b> , <b>bsh</b> ) for the use of any environment variables.  Check the OS environment for any installation-defined environment variables.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Are there any property files that need to be defined before the application can be run?</i>
		<b>Procedure</b>	Check for the existence of properties files.
		<b>Examples</b>	None
	<b>3.</b>	<b>Test</b>	<i>Are there any parameters that must be defined before the application can be run?</i>
		<b>Procedure</b>	Check for any startup parameters provided on the startup command line.
		<b>Examples</b>	None

## G1202

### Statement

Use the [CORBA Portable Object Adapter \(POA\)](#) instead of the [Basic Object Adapter \(BOA\)](#).

### Rationale

The CORBA Basic Object Adapter (BOA) was the CORBA Version 1 specification for the client-server object capability. The BOA specification was found to be so incomplete that vendor-specific interpretations were required for operable implementation. In CORBA Version 2, the Portable Object Adapter (POA) was significantly more complete and flexible. In the current marketplace, POA implementations are standard and, in quality implementations, are not vendor-specific. Consequently, using POA eliminates one significant area of vendor-specific coding.

BOA	POA
<p>Focuses on CORBA server implementations and not CORBA object implementations</p> <p>Naming convention issues on server side</p> <p>Tightly coupled to <a href="#">ORB</a> implementation</p> <p>Non-standardized way to connect to ORB</p> <p>Four activation models for server processes</p>	<p>Services for lifecycle management</p> <p>Abstract layer between ORB and object</p> <p>Standard, portable interface for communicating with ORB runtime</p> <p>Two servant incarnation styles</p>

### Derived From

[G1118]

### Justifies

### Referenced By

[CORBA](#)

### Acquisition Phase

Development

### Evaluation Criteria

- Test**

*Does any CORBA application code reference the **CORBA::BOA** identifier?*

#### Procedure

Review the code for the use of the **CORBA::BOA** identifier.

#### Examples

##### 1. BOA coding example

a. **Client side** - The code below shows a C++ CORBA client BOA initialization for the ORBIX ORB. Other ORB vendors may have different initialization sequences.

```
int main
( int argc,
  char **argv
)
{ MyServer_var MyVar;
  CORBA::ORB_ptr myOrbPtr
    = CORBA::ORB_init(argc, argv, "Orbix");
  try
  { // The default is the local host:
    MyVar = MyServer::_bind(":ServerName");
  } // End try
```

```

        catch ( CORBA::SystemException &sysEx )
        { cerr << "Unexpected system exception" <<
endl;
          cerr << &sysEx;
          exit(1);
        } // End CORBA::SystemException
        catch(...)
        { // an error occurred while trying
          // to bind to the grid object.
          cerr << "Bind to object failed" << endl;
          cerr << "Unexpected exception " << endl;
          exit(1);
        } // End catch ...
      } // End main

```

b. **Server side** - Use the code below as a model. This example shows a C++ CORBA server BOA init for the ORBIX ORB. For BOA, other ORBS will have a different initialization sequence.

```

try
{ MyObject::myOrb_
  = CORBA::ORB_init(argc, argv, "Orbix");
  MyObject::myboa_
  = MyObject::myOrb_->BOA_init(argc, argv,
    "Orbix_BOA");
} // End try
catch ( CORBA::SystemException &sysEx )
{ //some exception handling code
} // End catch
try
{ NoeLoggerCfg::myboa_
  >impl_is_ready("MyServiceName",
    CORBA::ORB::INFINITE_TIMEOUT);
} // End try
catch ( CORBA::SystemException &sysEx )
{ //exception handling code
}

```

## 2. POA coding example

a. **Client side** - This example shows a C++ CORBA client POA init for the ORBIX ORB. For BOA, other ORBS will have a different initialization sequence.

```

int main
( int argc,
  char **argv
)
{ CORBA::ORB_var myOrb = CORBA::ORB_init(argc,
argv);
  try
  { CORBA::Object_var obj
    = ... // however you get the object
reference
    if(CORBA::is_nil (obj))
    { cerr << "Nil object reference" << endl;
      throw 0;
    } // End if
  } // End try
  catch ( CORBA::SystemException &sysEx )
  { cerr << "Unexpected system exception" <<
endl;
    cerr << &sysEx;
    exit(1);
  } // End catch CORBA::SystemException
  catch ( ... )
  { cerr << "Unexpected system exception" <<
endl;
    exit(1);
  } // End catch ...
  myinterface::myobject_var myvar;

```



```

    try
    { myvar =
myinterface::myobject::_narrow(obj);
    } // End try
    catch ( CORBA::SystemException &sysEx)
    { cerr << "Unexpected system exception" <<
endl;
      cerr << &sysEx;
      exit(1);
    } // End catch CORBA::SystemException
  } // End main

```

b. **Server side** - Use the code below as a model. This example shows a C++ CORBA server POA init for the ORBIX ORB. For POA, other ORBS will have a different initialization sequence.

```

int main
( int argc,
  char *argv[ ]
)
{ try
  { // initialize the ORB
    orb_var orb = CORBA::ORB_init(argc, argv,
"Orbix");
    // obtain an object reference for the root
POA
    object_var obj
      = orb->resolve_initial_references
("RootPOA");
    POA_var poa = POA::_narrow(obj);
    // incarnate a servant
    My_Servant_Impl servant;
    // Implicitly register the servant with the
root POA
    obj = servant._this ();
    //start the POA listening for requests
    poa -> the_POAManager ()->activate ();
    //run the orb's event loop
    orb->run ();
  } // End try
  catch ( CORBA::SystemException &sysEx )
  { // some exception handling code
  } // End catch
} // End main

```

## G1203

<b>Statement</b>	Localize frequently used CORBA-specific code in modules that multiple applications can use.		
<b>Rationale</b>	In a family of applications, similar patterns of CORBA <a href="#">ORB</a> invocation sequences frequently arise. This is common in service object initialization, policy association, discovery, binding, and release handling. Implementing this functionality in a utility library paradigm localizes the code to reduce maintenance and facilitate extensibility, and assures consistency across the family of applications.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Do the standard object initialization CORBA invocations occur in more than one module?</i>
		<b>Procedure</b>	The presence of “ <b>CORBA::ORB_var</b> ” or “ <b>CORBA::ORB_init</b> ” in C++ indicates ORB initialization. The presence of “ <b>CORBA::Object_var</b> ” in C++ indicates ORB access.
		<b>Examples</b>	None
	2.	<b>Test</b>	<i>Do the standard object policy association CORBA invocations occur in more than one module?</i>
		<b>Procedure</b>	The presence of “ <b>CORBA::PolicyList</b> ” in C++ indicates policy presence.
		<b>Examples</b>	None
	3.	<b>Test</b>	<i>Do the standard object policy association CORBA invocations occur in more than one module?</i>
		<b>Procedure</b>	The presence of “ <b>CORBA::PolicyList</b> ” in C++ indicates policy presence.
		<b>Examples</b>	None
	4.	<b>Test</b>	<i>Do the standard object discovery CORBA invocations occur in more than one module?</i>
		<b>Procedure</b>	The presence of “ <b>Resolve_NamingService()</b> ” in C++ indicates intended access to one of CORBA’s discovery capabilities.
		<b>Examples</b>	None
	5.	<b>Test</b>	<i>Do the standard object binding and release CORBA invocations occur in more than one module?</i>
		<b>Procedure</b>	The presence of “ <b>::_narrow(obj.in())</b> ” or “ <b>CORBA::is_nil()</b> ” in C++ indicates activity associated with obtaining and validating an object binding to a

legitimate reference. The presence of “CORBA(release)” in C++ indicates intended release of a CORBA-bound object reference.

**Examples**      None

## G1204

<b>Statement</b>	Create configuration services to provide distributed user control of the appropriate configuration parameters.
<b>Rationale</b>	For user-modifiable configuration settings that are intended to be accessible by distributed processes at runtime, the appropriate mechanism for implementation involves <a href="#">CORBA</a> services. The first form is a network service to be invoked as a client by the target system application at initialization. This can support a consistent, network-wide distribution of startup parameters. The second form is a service implemented by the target application which allows communication to the application during execution (after startup). This allows <a href="#">real-time</a> configuration changes for matters such as <a href="#">POA</a> instantiation threading policies to address load management.
<b>Derived From</b>	<a href="#">[G1119]</a>
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">CORBA</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	<p><b>1.Test</b> <i>Is a service defined in the IDL to obtain the configuration parameters?</i></p> <p><b>Procedure</b> Review the code for a service that can be used to obtain configuration.</p> <p><b>Examples</b> The following code is an example of a CORBA server that instantiates a configuration service. The service manages the individual configuration parameters for the servers on the <a href="#">ORB</a>.</p>

---

### Ada example

```

CORBA.ORB.IIOP_English;
pragma Elaborate_All(CORBA.ORB.IIOP_English);
with CORBA ;
with CORBA.BOA ;
with CORBA.ORB ;
with CORBA.Object ;
with Configuration.Impl ;
with Configuration.Helper ;
with Ada.Exceptions ;
with Ada.Text_IO ;
with my_CORBA ;
with Event_Ada_API ;
procedure Configuration_Server is
  -- required for OrbExpress
  First_Variable : CORBA.ORB.Life_Span ;
  -- declare the object instance
  Configuration_Object : Configuration.Ref ;
  --variables needed for ior writing
  No_Timeout : constant := 0.0;
  Config_Name : constant String
    := Configuration.Helper.Simple_Name ;
  Config_Host : Corba.String ;
  Config_Port : Corba.String ;
begin -- Configuration_Server
  -- create (and initialize) the object
  -- config file is read and the port needed
  -- is in there
  Configuration_Object
    := Configuration.Impl.Create(Config_Name) ;

```

```

GET_HOSTNAME:
begin
    Config_Host
        := Configuration.Get_String
            ( Self => Configuration_Object,
              Name => Corba.To_Corba_String
                  ( "Local_Host_Shortname" )
            );
exception -- GET_HOSTNAME
when others =>
    Ada.Text_IO.Put_Line
        ( "ERROR: Missing parameter "
          & "<Local_Host_Shortname> "
          & "in the config_parameters.txt file."
        );
end GET_HOSTNAME;
GET_CS_PORT:
begin
    Config_Port
        := Configuration.Get_String
            ( Self => Configuration_Object,
              Name => Corba.To_Corba_String
                  ( "Config_Service_Port" )
            );
Exception -- GET_CS_PORT
when others =>
    Ada.Text_IO.Put_Line
        ( "ERROR: Missing parameter "
          & "<Config_Service_Port> "
          & "in the config_parameters.txt file."
        );
end GET_CS_PORT;
Ada.Text_IO.Put_Line
    ( "Host => "
      & Corba.To_Standard_String(Config_Host)
      & " Port => "
      & Corba.To_Standard_String(Config_Port)
    );
--timeout 0 so we can write IOR out
CORBA.BOA.Impl_Is_Ready
    ( Time_Out          => No_Timeout,
      Server_Instance_Name => Config_Name,
      Listen_On_Endpoints =>
          "tcp://"
          & Corba.To_Standard_String(Config_Host)
          & ":"
          & Corba.To_Standard_String(Config_Port)
    );
-----
-- HERE IS WHERE CODE FOR THE IOR TO BE
-- USED ON THE C++ ORB
-----
-- get the IOR and write it to disk
my_CORBA.Write_IOR_To_File
    ( Server_Name => Config_Name,
      Server_Ref  =>
          CORBA.Object.Ref(Configuration_Object)
    );
READY_BLOCK:
begin
    -- notify subscribers of availability
    -- of configuration parameters via the
    -- event service
    Event_Ada_API.Send
        ( Channel_Name => "Config_Channel",
          Event         => "Configuration Service Ready."
        );
Exception - READY_BLOCK
when others =>

```

```

        Ada.Text_IO.Put_line
        ( "Configuration_Server : "
          & Exception sending ready signal."
        );
    end READY_BLOCK;
    Ada.Text_IO.Put_line
    ( "Configuration_Server : "
      & Configuration Service Ready."
    );
    CORBA.BOA.Impl_Is_Ready
    ( Time_Out          => CORBA.Infinite_Timeout,
      Server_Instance_Name => Config_Name
    );
exception -- Configuration_Server
when X_Other: others =>
    Ada.Text_IO.Put_line
    ( "Configuration_Server : "
      & Ada.Exceptions.Exception_Name(X_Other)
    );
end Configuration_Server ;

```

---

### *C++ example*

The following code snippets depict a C++ server that instantiates a version collection service for an About box. It uses the IORs from the servers on the Ada ORB via the IOR files, and invokes those objects to get version information. It uses the utility templates for binding. It exemplifies the approach described in Encapsulate CORBA ORB operations for C++.

Note: This was done on the ORBIX C++ and Ada ORBs.

```

#include <iostream.h>
#include <rw/cstring.h>
#ifdef _STDIO_H
#include <stdio.h>
#endif
#ifdef _STRING_H
#include <string.h>
#endif
#ifdef _STDLIB_H
#include <stdlib.h>
#endif
#ifdef _ASSERT_H
#include <assert.h>
#endif
// Include files for all the objects desired for
// collecting version information
//Ada configuration service
#ifdef configuration_hh
#include <configuration.hh>
#endif
// include files for other desired services;
// removed for brevity
// other support objects and utilities
#ifdef _CORBA_UTILS__
#include <corba_utils.h>
#endif
#ifdef __LOG_API_H__
#include <log_api.h>
#endif
#ifdef _VERSION_AGENT_GLOBALS_H_
#include "version_agent_globals.h"
#endif
const RWCString Version_Agent_i::MSG_VERSION_NOT_FOUND_
= "Version Info. not found for ";
const CORBA::ULong Version_Agent_i::MAXSERVERS_
= 12;

```

```

Version_Agent_i:: Version_Agent_i(): theVersionInfoPtr_(0)
{
    theVersionInfoPtr_
        = new versionInfoType(MAXSERVERS_);
    theVersionInfoPtr_->length(MAXSERVERS_);
} // End constructor
Version_Agent_i::~ ~Version_Agent_i()
{
    // Do nothing
} // End destructor
/*****
FUNCTION NAME: createVersions
PURPOSE: helper function that gets the version info
INPUT:
OUTPUT:
*****/
void Version_Agent_i::createVersions ()
{
    char *iorString;
    int bBindOk = 0;
    int versionCnt = 0;
    versionInfoType* rl = theVersionInfoPtr_;
    CORBA::ULong MAXSERVERS Version_Agent_i::MAXSERVERS_;
    // server variables for all the objects desired
    // for collecting version information
    // most declarations removed for brevity
    EventServiceFactory_var es_var;
    // Ada configuration service
    Configuration_var cfg_var;
    // == load the versions of the individual components
    // Code for other services removed for brevity
    // This is an ADA service using the IOR string
    { //***** config service *****/
        logMsg
            ( "get config service version",
              Log_Api::DEBUG_1_MSG
            );
        RWCString errMsg
            ( Version_Agent_i::MSG_VERSION_NOT_FOUND_.data()
            );
        errMsg.append ( "Configuration Service" );
        // here we get the IOR from the ADA orb using
        // the helper methods
        iorString = getIorFile("Configuration");
        //template class to hide binding issues to the ADA ORB
        If ( iorString )
        {
            Ada_Binder < Configuration,
            Configuration_var > bo ( iorString );
            bBindOk = bo.bindToAda(&cfg_var) ;
            // get the version info and load it
            If ( bBindOk
                && !( CORBA::is_nil(cfg_var))
            )
            {
                try
                {
                    char* str = cfg_var->version();
                    if ( str )
                    {
                        ( *theVersionInfoPtr_)[versionCnt]
                            = CORBA::string_dup(str);
                        delete str;
                    } // End if
                    else
                    {
                        ( *theVersionInfoPtr_)[versionCnt]
                            = CORBA::string_dup(errMsg.data());
                    } // End else
                } // End try
                catch(...)
                {
                    ( *theVersionInfoPtr_)[versionCnt]
                        = CORBA::string_dup(errMsg.data());
                } // End catch
                cfg_var->_closeChannel();
            } // End if
            else
            {
                ( *theVersionInfoPtr_)[versionCnt]

```

```

        = CORBA::string_dup(errMsg.data());
    } // End else
    if(iorString)
    { free (iorString);
      iorString = NULL;
    } // End if
  } //endif iorstring
else
{ (*theVersionInfoPtr_)[versionCnt]
  = CORBA::string_dup(errMsg.data());
} // End else
//leaving scope releases the corba object
} //end cfg_svf
bBindOk = 0;
versionCnt++;
assert(versionCnt <= MAXSERVERS);
} // End createVersions
/*****
FUNCTION NAME: start
PURPOSE:  handle startup specific stuff
INPUT:
OUTPUT:
*****/
void Version_Agent_i:: start
( CORBA::Environment &IT_env
) throw (CORBA::SystemException)
{ //get all the version info
  createVersions();
} // End start
/*****
FUNCTION NAME: stop
PURPOSE:  handle stop specific stuff
INPUT:
OUTPUT:
*****/
void Version_Agent_i:: stop
( CORBA::Environment &IT_env
) throw (CORBA::SystemException)
{ // Release info
  // Let CORBA time out the service
  logMsg ( "stop received" );
  VersionAgentGlobals::myboa->setNoHangup ( 0 );
  VersionAgentGlobals::myboa->deactivate_impl
    ( "Version_Agent" );
} //end version impl

```



## G1205

<b>Statement</b>	Use non-source code persistence to store all user-modifiable <a href="#">CORBA</a> service configuration parameters.		
<b>Rationale</b>	<p>For user-modifiable configuration settings that are host-specific and that are not intended to be accessible by distributed processes at runtime, the appropriate mechanism for implementation involves local persistent storage. The appropriate form of local storage depends on the local host architecture and may be file- or host-DBMS oriented. It is important that such parameters are not stored in source code that requires build processes for modification.</p> <p>It should be noted that for <a href="#">SOA</a> services, configuration parameters relating to invoked services should not be service-host-specific at the invoking client application.</p>		
<b>Derived From</b>	<a href="#">[G1119]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">CORBA</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are there any user-modifiable configuration parameters hard coded in the non-auto-generated files?</i>
		<b>Procedure</b>	Inspect the code for constant strings or constants that contain configuration parameters.
		<b>Examples</b>	None

## G1208

<b>Statement</b>	Add new functionality rather than redefining existing interfaces in a manner that brings incompatibility.		
<b>Rationale</b>	By not replacing old methods of objects, library functionality consumers can continue to operate and not be forced to upgrade.		
<b>Derived From</b>	<a href="#">[G1004]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Are methods that are being replaced marked with deprecated tags?</i>
		<b>Procedure</b>	Check revision history to make sure that methods are deprecated and not removed unless they have expired. "Expired" means that they have passed the expected shelf life, as defined by the project standards or other standards documentation.
		<b>Examples</b>	None
	2.	<b>Test</b>	<i>Do new methods being added contain information on methods they are replacing?</i>
		<b>Procedure</b>	Check to make sure newly added methods contain information and rationale on the methods they are replacing.
		<b>Examples</b>	None

## G1209

<b>Statement</b>	For Java, use <a href="#">JDK</a> logging facilities.		
<b>Rationale</b>	Java has a built-in logging framework that is portable across platforms, projects, and installations.		
<b>Derived From</b>	<a href="#">[G1010]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application use anything other than the specified logging frameworks?</i>
		<b>Procedure</b>	Check for use of logging frameworks other than the JDK.
		<b>Examples</b>	None

## G1210

<b>Statement</b>	For <a href="#">.NET</a> , use Debug and Trace from the <b>System.Diagnostics</b> <a href="#">namespace</a> .		
<b>Rationale</b>	.NET has a built-in logging framework that is portable across .NET projects and installations.		
<b>Derived From</b>	<a href="#">[G1010]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application use anything other than the specified logging frameworks?</i>
		<b>Procedure</b>	Check for use of logging frameworks other than <b>System.Diagnostics</b> .
		<b>Examples</b>	None

## G1211

<b>Statement</b>	For Java, use <a href="#">JDBC</a> .		
<b>Rationale</b>	JDBC is Java's standard <a href="#">API</a> for accessing databases.		
<b>Derived From</b>	<a href="#">[G1014]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	<a href="#">Decouple from Applications</a>		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application use an API other than JDBC to access the database?</i>
		<b>Procedure</b>	Check for vendor-specific APIs such as Oracle's OCI.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	Does the application use a vendor specific extension that is not ANSI-compliant <a href="#">SQL</a> ?
		<b>Procedure</b>	Check for non- <a href="#">ANSI</a> -compliant SQL.
		<b>Examples</b>	None

## G1212

<b>Statement</b>	For C/C++ and <a href="#">.NET</a> use <a href="#">ODBC</a> .		
<b>Rationale</b>	ODBC is C/C++ Window's standard <a href="#">API</a> for accessing databases.		
<b>Derived From</b>	<a href="#">[G1014]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	<a href="#">Decouple from Applications</a>		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the application use an API other than ODBC to access the database?</i>
		<b>Procedure</b>	Check for vendor-specific API.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	Does the application use vendor-specific extension that is not ANSI-compliant <a href="#">SQL</a> ?
		<b>Procedure</b>	Check for non- <a href="#">ANSI</a> -compliant SQL..
		<b>Examples</b>	None

## G1213

<b>Statement</b>	Provide an architecture design document.	
<b>Rationale</b>	An architectural design document provides the evaluators with a roadmap of the application. This helps the evaluator verify that the application follows guidance such as using the Model View Controller model.	
<b>Derived From</b>	<a href="#">[G1020]</a>	
<b>Justifies</b>	<a href="#">Public Interface Design</a>	
<b>Referenced By</b>	Development	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	1.	<p><b>Test</b> <i>Do the project deliverables for evaluation include a document that contains the architectural design of the application?</i></p> <p><b>Procedure</b> See if an architectural design document exists.</p> <p><b>Examples</b> None</p>

## G1214

<b>Statement</b>	Provide a document with a plan for <a href="#">deprecating</a> obsolete <a href="#">interfaces</a> .		
<b>Rationale</b>	This information allows users to phase out deprecated interfaces. For instance, Sun plans to maintain backward compatibility for the <a href="#">JDK</a> for seven years. This means developers can count on deprecated methods not being removed for seven years.		
<b>Derived From</b>	<a href="#">[G1020]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Public Interface Design</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Do the project deliverables for evaluation include a document that contains a plan for deprecating obsolete interfaces?</i>
		<b>Procedure</b>	See if a document with a plan for deprecating obsolete interfaces exists.
		<b>Examples</b>	None.



## G1215

<b>Statement</b>	Provide a coding standards document.	
<b>Rationale</b>	The standards ensure a consistent code base. A coding standards document defines rules to keep code readable and maintainable.	
<b>Derived From</b>	<a href="#">[G1020]</a>	
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">Public Interface Design</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Do the project deliverables for evaluation include a coding standards document?</i>
	<b>Procedure</b>	See if a coding standards document exists.
	<b>Examples</b>	None

## G1216

<b>Statement</b>	Provide a software release plan document.		
<b>Rationale</b>	The release plan document ensures that there is a formal process for releasing the software. It includes a description of how to acquire the software from SCM and how to build, label, and release it.		
<b>Derived From</b>	<a href="#">[G1020]</a>		
<b>Justifies</b>	<a href="#">Public Interface Design</a>		
<b>Referenced By</b>	Development		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Do the project deliverables for evaluation contain a release plan document?</i>
		<b>Procedure</b>	See if a software release plan exists.
		<b>Examples</b>	None

## G1217

**Statement**

[Components](#) should be externally configurable.

**Rationale**

To be portable and to accommodate reuse, components must be configurable using external descriptors usually defined in [XML](#). Examples of things that might need to be configured include:

- A data source for the component to obtain a [JDBC](#) connection
- The location of a service that the component must communicate with
- The location of implementation classes that the component uses

**Derived From**
**Justifies**
**Referenced By**

[Implement a Component-Based Architecture](#), [G1002]

**Acquisition  
Phase**

Development

**Evaluation  
Criteria**

- |    |                  |  |
|----|------------------|--|
| 1. | <b>Test</b>      | <i>Are deployment descriptors used?</i>  |
|    | <b>Procedure</b> | Check for the existence of deployment descriptors in the appropriate directories. Usually the file is named <b>web.xml</b> . |
|    | <b>Examples</b>  | None   |

## G1218

<b>Statement</b>	Support operation in an automated mode.	
<b>Rationale</b>	During testing, human interaction can be a cause of error and unrepeatable results. Operating in automated mode can eliminate these errors.	
<b>Derived From</b>	<a href="#">[G1190]</a>	
<b>Justifies</b>	<a href="#">[G1002]</a>	
<b>Referenced By</b>	<a href="#">Automate the Build Process</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Does the tool have a build all target?</i>
	<b>Procedure</b>	Check the build scripts or descriptors of the build tool for the ability to build the entire project, system, or application.
	<b>Examples</b>	None

## G1219

<b>Statement</b>	Check out files from configuration control.		
<b>Rationale</b>	To make sure all the parts of the build are under configuration control, compare all files with the configuration baseline, and download the appropriate files.		
<b>Derived From</b>	<a href="#">[G1190]</a>		
<b>Justifies</b>	<a href="#">[G1002]</a>		
<b>Referenced By</b>	<a href="#">Automate the Build Process</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the tool have a checkout target?</i>
		<b>Procedure</b>	Check the build scripts or descriptors of the build tool for the ability to check out the entire project, system, or application.
		<b>Examples</b>	None

## G1220

<b>Statement</b>	<a href="#">Compiles</a> source code and dependencies that have been modified.		
<b>Rationale</b>	To limit the changes made between builds, only compile code that has been modified. If there are no intermediate files, then compile all files.		
<b>Derived From</b>	<a href="#">[G1190]</a>		
<b>Justifies</b>	<a href="#">[G1002]</a>		
<b>Referenced By</b>	<a href="#">Automate the Build Process</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the tool have a compile target?</i>
		<b>Procedure</b>	Check the build scripts or descriptors of the build tool for the ability to compile the entire project, system, or application.
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Do all the intermediate files (e.g., <b>.obj</b> or <b>.class</b>) have the same date and time stamps?</i>
		<b>Procedure</b>	Scan the files for date and time stamps.
		<b>Examples</b>	None

## G1221

<b>Statement</b>	Create libraries or archives after all required compilations are completed.		
<b>Rationale</b>	Libraries should be able to be recreated independently of any executables and should always verify that any intermediate files are not stale.		
<b>Derived From</b>	<a href="#">[G1190]</a>		
<b>Justifies</b>	<a href="#">[G1002]</a>		
<b>Referenced By</b>	<a href="#">Automate the Build Process</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the tool have a generate library target?</i>
		<b>Procedure</b>	Check the build scripts or descriptors of the build tool for the ability to generate the composing libraries or archives.
		<b>Examples</b>	None

## G1222

<b>Statement</b>	Create executables	
<b>Rationale</b>	An executable is dependent on many files, including source files, intermediate files, and libraries or archives. The building of the executable must support a control process that includes configuration management, compiling, and testing.	
<b>Derived From</b>	<a href="#">[G1190]</a>	
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">Automate the Build Process</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Does the tool have an executable target?</i>
	<b>Procedure</b>	Check the build scripts or build tool descriptors for the ability to build the executables for the entire project, system, or application.
	<b>Examples</b>	None



## G1223

<b>Statement</b>	Capable of running unit tests.	
<b>Rationale</b>	<p>All code should be able to be tested independently of creating intermediate files, libraries, or executables.</p> <p>Tests should be unit tests as well as system-level tests.</p>	
<b>Derived From</b>	<a href="#">[G1190]</a>	
<b>Justifies</b>	<a href="#">Automate the Build Process</a>	
<b>Referenced By</b>		
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Does the tool have a test target?</i>
	<b>Procedure</b>	Check the build scripts or descriptors of the build tool for the ability to test the entire project, system, or application.
	<b>Examples</b>	None

## G1224

<b>Statement</b>	Clean out intermediate files that can be regenerated.		
<b>Rationale</b>	For security reasons, all files that comprise the build need to be under configuration control. Cleaning out all files is essential in ensuring that only approved code is incorporated into the build.		
<b>Derived From</b>	<a href="#">[G1190]</a>		
<b>Justifies</b>	<a href="#">Automate the Build Process</a>		
<b>Referenced By</b>	Development		
<b>Acquisition Phase</b>			
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Does the tool have a clean target?</i>
		<b>Procedure</b>	Check the build scripts or descriptors for the build tool for the ability to remove the entire project, system, or application files.
		<b>Examples</b>	None

## G1225

<b>Statement</b>	The build tool should be independent of the <a href="#">Integrated Development Environment</a>		
<b>Rationale</b>	Some build tools are tightly coupled with an <a href="#">Integrated Development Environment (IDE)</a> that causes vendor lock-in and license issues when the software is delivered to the government.		
<b>Derived From</b>	<a href="#">[G1190]</a>		
<b>Justifies</b>	<a href="#">Automate the Build Process</a>		
<b>Referenced By</b>	Development		
<b>Acquisition Phase</b>			
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Does the build tool require a license?</i>
		<b>Procedure</b>	Check for files with the name <b>makefile</b> .
		<b>Examples</b>	None
	2.	<b>Test</b>	<i>Is the build tool one of the recognized standards, such as <b>ant</b>?</i>
		<b>Procedure</b>	Check for files named <b>build.xml</b> .
		<b>Examples</b>	None
	3.	<b>Test</b>	<i>Is the build tool one of the recognized standards, such as <b>make</b> or <b>nmake</b>?</i>
		<b>Procedure</b>	Check for files with the name <b>makefile</b> .
		<b>Examples</b>	None

## G1236

<b>Statement</b>	Do not hard-code the <a href="#">endpoint</a> of a <a href="#">web service vendor</a> .		
<b>Rationale</b>	An endpoint is the URL or location of the <a href="#">web service</a> on the <a href="#">Internet</a> . A major benefit of web services is the ability to relocate a web service to another location, or dynamically discover and use a web service using registry facilities. Some web service vendors hard- code the URL of the web service, which causes maintenance and portability problems.		
<b>Derived From</b>	<a href="#">[G1091]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Insulation and Structure</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are there any hard-coded web service vendor endpoints in the client code?</i>
		<b>Procedure</b>	Parse the code and look for hard-coded endpoints. These endpoints look just like a normal HTTP web address.
		<b>Examples</b>	None

## G1237

<b>Statement</b>	Do not hard-code the configuration data of a <a href="#">web service vendor</a> .		
<b>Rationale</b>	Some vendors generate code that passes web-service vendor-specific configuration data during initialization or startup. This reduces the portability of the code and can cause maintenance problems later.		
<b>Derived From</b>	<a href="#">[G1091]</a>		
<b>Justifies</b>	<a href="#">Insulation and Structure</a>		
<b>Referenced By</b>	Development		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is there any web-service vendor-specific configuration data in the client code?</i>
		<b>Procedure</b>	Parse the code and look for hard-coded configuration data that might be used to configure the vendor's web service.
		<b>Examples</b>	None

## G1239

<b>Statement</b>	Vendor-dependent connections to the enterprise should isolate vendor-specifics using design patterns (e.g., <a href="#">façade</a> , <a href="#">proxy</a> , or <a href="#">adapter</a> ) or property files.		
<b>Rationale</b>	Increases maintainability. Guidance <a href="#">[G1071]</a> asserts that vendor-neutral connection mechanisms should be used. When vendor-specific connection mechanisms are unavoidable, this guidance will apply.		
<b>Derived From</b>	<a href="#">[G1071]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is the connection mechanism vendor-dependent?</i>
		<b>Procedure</b>	Examine the source code for vendor-specific imports or includes.  Make sure that all references to the vendor-specific connection mechanisms are isolated to a single class (like a helper) or set of methods that are used as part of an isolation design pattern such as façade, proxy, or adapter.  Also, look for hard-coded vendor-specific connection strings.
		<b>Examples</b>	None

## G1245


<b>Statement</b>	Isolate the web-service portlet from platform dependencies using the <i>OASIS WSRP Specification 1.0</i> protocol.		
<b>Rationale</b>	The OASIS <a href="#">WRSP</a> 1.0 Specification accounts for the fact that <a href="#">producers</a> and <a href="#">consumers</a> may be implemented on very different platforms, such as a J2EE -based web service, a web service implemented on Microsoft's .Net platform, or a <a href="#">portlet</a> published directly by a <a href="#">portal</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Web Portals</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Does the web service implement the WRSP Markup interface?</i>
		<b>Procedure</b>	Look for the definition of the <b>getMarkup</b> , <b>performBlockingInteraction</b> , <b>initCookie</b> and <b>releaseSessions</b> methods as defined in the OASIS WSRP Markup <a href="#">API</a> Specification.
		<b>Examples</b>	<pre> public MarkupResponse getMarkup ( RegistrationContext registrationContext,   PortletContext portletContext,   RuntimeContext runtimeContext,   UserContext userContext,   MarkupParams markupParams ) throws java.lang.Exception public void performBlockingInteraction ( RegistrationContext registrationContext,   PortletContext portletContext,   RuntimeContext runtimeContext,   UserContext userContext,   MarkupParams markupParams,   InteractionParams interactionParams ) throws java.lang.Exception public Extension[] initCookie ( RegistrationContext registrationContext ) throws java.lang.Exception public Extension[] releaseSessions ( RegistrationContext registrationContext,   java.lang.String[] sessionIDs ) throws java.lang.Exception </pre>
	2.	<b>Test</b>	<i>Does the web service implement the WRSP Service Description interface?</i>
		<b>Procedure</b>	Look for the occurrence of the <b>getService</b> , <b>register</b> , and <b>getServiceDescription</b> methods as defined in the OASIS WSRP Service Description API Specification.
		<b>Examples</b>	<pre> public static ServiceDescriptionService getService ( java.lang.String baseEndpoint ) throws java.lang.ExceptionThrows: jpublic ServiceDescription getServiceDescription ( RegistrationContext registrationContext,   java.lang.String[] desiredLocales </pre>

		<code>) throws java.lang.Exception</code>
3.	Test	<i>Does the web service implement the WRSP Portlet Configuration interface?</i>
	Procedure	Look for the occurrence of the <code>getService</code> , <code>getPortletDescription</code> , <code>clonePortlet</code> , <code>destroyPortlets</code> , <code>setPortletProperties</code> , <code>getPortletProperties</code> and <code>getPortletPropertyDescription</code> methods as defined in the OASIS WSRP Portlet Configuration API Specification.
	Examples	<pre> public static PortletManagementService getService ( java.lang.String baseEndpoint ) throws java.lang.Exception public PortletDescriptionResponse getPortletDescription ( RegistrationContext registrationContext,   PortletContext portletContext,   UserContext userContext,   java.lang.String[] desiredLocales ) throws java.lang.Exception public PortletContext clonePortlet ( RegistrationContext registrationContext,   PortletContext portletContext,   UserContext userContext ) throws java.lang.Exception public DestroyPortletsResponse destroyPortlets ( RegistrationContext registrationContext,   java.lang.String[] portletHandles ) throws java.lang.Exception public PortletContext setPortletProperties ( RegistrationContext registrationContext,   PortletContext portletContext,   UserContext userContext,   PropertyList propertyList ) throws java.lang.Exception public PropertyList getPortletProperties ( RegistrationContext registrationContext,   PortletContext portletContext,   UserContext userContext,   java.lang.String[] names ) throws java.lang.Exception public PortletPropertyDescriptionResponse getPortletPropertyDescription ( RegistrationContext registrationContext,   PortletContext portletContext,   UserContext userContext,   java.lang.String[] desiredLocales ) throws java.lang.ExceptionThrows </pre>
4.	Test	<i>Does the web service implement the WRSP Registration interface?</i>
	Procedure	Look for the occurrence of the <code>getService</code> , <code>register</code> , <code>deregister</code> , and <code>modifyRegistration</code> methods as defined in the OASIS WSRP Specification.
	Examples	<pre> public static RegistrationService getService ( java.lang.String baseEndpoint ) throws java.lang.Exception public RegistrationContext register ( java.lang.String consumerName,   java.lang.String consumerAgent,   boolean methodGetSupported, </pre>



```
        java.lang.String[] consumerModes,  
        java.lang.String[] consumerWindowStates,  
        java.lang.String[] consumerUserScopes,  
        java.lang.String[] customUserProfileData,  
        Property[] registrationProperties  
    ) throws java.lang.Exception  
public ReturnAny deregister  
    ( java.lang.String registrationHandle,  
      byte[] registrationState  
    ) throws java.lang.Exception  
public RegistrationState modifyRegistration  
    ( RegistrationContext registrationContext,  
      RegistrationData registrationData  
    ) throws java.lang.Exception
```

## G1267

<b>Statement:</b>	Use industry standard HTML data entry fields on web pages.
<b>Rationale:</b>	Macromedia Flash and Java Applets can also be used for data input, but are not HTML standards and tend to decrease the maintainability of a website.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Look Aspects</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1.     <b>Test:</b>           <i>Do any web pages have data entry fields?</i></p> <p>          <b>Procedure:</b>   Search all web pages for the “applet” and “embed” tags. Load each page found in the search by loading and visually inspecting to see if Flash or Applets are used for data entry.</p> <p>          <b>Examples:</b></p> <p>                  Correct usage:</p> <p>                  </p> <p>                  <pre>&lt;form method="post" action="myaction"&gt;Person's Name: &lt;input type="text" name="persons-name" size="40" maxlength="40"&gt; &lt;/form&gt;</pre></p> <p>                  Incorrect usage:</p> <p>                  Applet:</p> <p>                  <pre>&lt;applet code="inputtextfield.class" width="200" height="200"&gt;</pre></p> <p>                  Flash:</p> <p>                  <pre>&lt;embed src="inputtextfield.swf" width="200" height="200"&gt;</pre></p>

## G1268

<b>Statement:</b>	Label all data entry fields.		
<b>Rationale:</b>	A label provides the user with a brief description of the text to be entered. Labels are essential for a user to understand the data entry field.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Look Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Are all data entry fields labeled?</i>
		<b>Procedure:</b>	Search all web pages for the word “form” and load each resulting web page in a browser. Visually inspect each data entry field to make sure they have labels.
		<b>Examples:</b>	None

## G1269

<b>Statement:</b>	A label should appear either to the left or above data entry fields.		
<b>Rationale:</b>	Putting labels to the left or above makes data entry forms easier to understand because user read from left to right and top to bottom. The trade-offs between placing a label to the left or above would be: labels to the left can be hard to associate with the relevant field if the distance between the two is too far while labels placed above the field will increase the overall length of the page and necessitate additional scrolling.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Look Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Do any labels appear to the right or below a data entry field?</i>
		<b>Procedure:</b>	Search all web pages for the word “form” and load each resulting web page in a browser. Visually inspect each data entry field to make sure the labels are to the left or top.
		<b>Examples:</b>	None

## G1270

<b>Statement:</b>	Text entry areas must include scroll bars if the data buffer is greater than the viewable area.		
<b>Rationale:</b>	Scroll bars provide a visual cue to the user that the text extends beyond the viewable area. Scroll bars will appear by default for an HTML text area.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Look Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<i>Do any web pages turn off scroll bars for text areas?</i>
		<b>Procedure:</b>	Search all web pages and style sheets for the phrase “overflow:hidden” or a form thereof. This turns off scroll bars using styles, but only works in certain browsers. Make sure it is not used.
		<b>Examples:</b>	<p>Correct usage:            Scroll bars should not be hidden.</p> <p>Incorrect usage:            Inline style:  <pre>&lt;html&gt; &lt;body&gt; &lt;form&gt; &lt;textarea style="overflow:hidden"&gt;&lt;/textarea&gt; &lt;/form&gt; &lt;/body&gt; &lt;/html&gt;</pre>           External style:  <pre>textarea.scroll{overflow:hidden;}</pre> </p>

## G1271

<b>Statement:</b>	Provide instructions and HTML examples for all style sheets.		
<b>Rationale:</b>	An instruction manual will enable developers to use the style sheet correctly and efficiently.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Look Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1. Test:</b>	<i>Are instructions included for each style sheet provided?</i>	
	<b>Procedure:</b>	Verify that a document is provided that contains instructions and example code for each style provided.	
	<b>Examples:</b>	<p><b>Correct usage:</b>  Cascading style sheet:  <td>items{text-align:right;}</td></p> <p>Example of usage:</p> <pre>&lt;table&gt; &lt;tr&gt;   &lt;td style="items"&gt;100&lt;/td&gt; &lt;/tr&gt; &lt;/table&gt;</pre> <p><b>Incorrect usage:</b>  No HTML example explaining style usage.</p>	

## G1275

<b>Statement:</b>	Use style sheets for web pages.
<b>Rationale:</b>	A style sheet, by serving as the starting point for all the pages in a website, helps to ensure that all pages have the same basic features and appearance. Style sheets allow web designers to use a single file to control the style and layout of multiple web pages.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Feel Aspects</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1.     <b>Test:</b>           <i>Does every web page use a style sheet?</i></p> <p>          <b>Procedure:</b>   Search every web page for a “link” tag and make sure it exist in every web page that contains a header.</p> <p>          <b>Examples:</b>    Correct usage:</p> <pre> &lt;head&gt; &lt;link rel="stylesheet" type="text/css" href="mystyle.css"/&gt; &lt;/head&gt; </pre> <p>                              Incorrect usage:</p> <pre> &lt;head&gt; (no link tag, no style sheet) &lt;/head&gt; </pre>

## G1276

**Statement:** Do not modify the contents of the web browser's status bar.

**Rationale:** Gratuitous scrolling text often amounts to little more than showing off, and it can slow access to your pages.

**Derived From**

**Justifies**

**Referenced By** [Feel Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Do any of the web pages modify the browser status bar?*

**Procedure:** Search every web page for the word "status" and visually inspect each of the search results to see if the status bar has been modified.

**Examples:** Correct usage:

```
Web pages contain no references to  
window.status
```

Incorrect usage:

```
window.status = 'text to display in status  
bar'
```



## G1277

<b>Statement:</b>	Do not use tickers on a web site.
<b>Rationale:</b>	Irritates the user and uses unnecessary bandwidth.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Feel Aspects</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1.     <b>Test:</b>           <i>Do any web pages contain scrolling text?</i></p> <p>          <b>Procedure:</b>   Most tickers are written using Flash or Applets. Search all web pages for the “applet” and “embed” tags. Load each page found in the search and visually inspect to make sure no tickers exist.</p> <p>          <b>Examples:</b>    Correct usage:</p> <p style="padding-left: 40px;"><code>No applet or flash references contain tickers.</code></p> <p>                              Incorrect usage:</p> <p>                              Applet:</p> <p style="padding-left: 40px;"><code>&lt;applet code="myticker.class" width="200" height="200"&gt;</code></p> <p>                              Flash:</p> <p style="padding-left: 40px;"><code>&lt;embed src="myticker.swf" width="200" height="200"&gt;</code></p>

## G1278

<b>Statement:</b>	Use the browser default setting for links.		
<b>Rationale:</b>	Browsers underline links by default. Do not rely on "mouse over" to identify links. Using mouse over to designate links can confuse and slow down infrequent users because they are uncertain which links perform which functions.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Feel Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<i>Do any web pages or style sheets modify the browser default settings for links?</i>
		<b>Procedure:</b>	Search all the web pages and style sheets for “A:link”, “A:visited” and “A:active”. Inspect all search results and make sure none of them modify the “A:” items.
		<b>Examples:</b>	<p>Correct usage:</p> <pre>Web pages and style sheets should have no reference to A:link, A:visited or A:active.</pre> <p>Incorrect usage:</p> <pre>A:link, A:visited, A:active{text- decoration:none;}</pre>

## G1279

<b>Statement:</b>	In tabular data displays, alphabetic data should be left justified within a column.
<b>Rationale:</b>	Text, which is left, justified is easier to read.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Feel Aspects</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1.     <b>Test:</b>           <i>Is all-tabular alphabetic data left justified?</i></p> <p>          <b>Procedure:</b>   Search all style sheets for the word “text-align”. Examine the results for tabular alphabetic data and make sure the “text-align” attribute is set to “left”. May need to visually inspect web pages to see if a defined align style is used within the tabular data.</p> <p>          <b>Examples:</b>    Correct usage:                                      Cascading style sheet:</p> <pre>       .td-textonly{text-align:left;} </pre> <p>                              HTML:</p> <pre>       &lt;table&gt;       &lt;tr&gt;         &lt;td style="textonly"&gt;Smith&lt;/td&gt;       &lt;/tr&gt;       &lt;/table&gt; </pre> <p>                              Incorrect usage:</p> <pre>       No alignment or incorrect alignment used. </pre>

## G1280

**Statement:** In tabular data displays, numeric data without decimals should be right justified.

**Rationale:** Whole numbers, displayed in a column are commonly aligned starting with the number in the 10's place.

**Derived From**

**Justifies**

**Referenced By** [Feel Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Is all tabular whole number data right-justified?*

**Procedure:** Search all style sheets for the word “text-align”. Examine the results for tabular whole number data and make sure the “text-align” attribute is set to “right”. May need to visually inspect web pages to see if a defined align style is used within the tabular data.

**Examples:** Correct usage:  
Cascading style sheet:

```
.td-items{text-align:right;}
```

HTML:

```
<table>
<tr>
  <td style="items">100</td>
</tr>
</table>
```

Incorrect usage:

No alignment or incorrect alignment used.

# G1281

<b>Statement:</b>	In tabular data displays, numeric data with decimals should be justified by the decimal point.		
<b>Rationale:</b>	It is common practice to align non-whole numbers by the decimal point for readability.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Feel Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<i>Is all-tabular non-whole number data justified by decimal point?</i>
		<b>Procedure:</b>	Search all style sheets for the word “text-align”. Examine the results for tabular non-whole number data and make sure the “text-align” attribute is set to “.”. May need to visually inspect web pages to see if a defined align style is used within the tabular data.
		<b>Examples:</b>	<p>Correct usage:</p> <p>Cascading style sheet:</p> <pre>.td-subtotal{text-align:".";}</pre> <p>HTML:</p> <pre>&lt;table&gt; &lt;tr&gt;   &lt;td style="subtotal"&gt;100.33&lt;/td&gt; &lt;/tr&gt; &lt;/table&gt;</pre> <p>Incorrect usage:</p> <p>No alignment or incorrect alignment used.</p>

## G1282

**Statement:** Never use leading zeros in numeric data.

**Rationale:** Leading zeros are usually not used when using numeric variables such as integer, float, long, or short. In most coding languages, numeric data is displayed without leading zeros.

**Derived From**

**Justifies**

**Referenced By** [Feel Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Does the application output numeric data without leading zeros?*

**Procedure:** Visually inspect numeric data in all web pages and style sheets and make sure leading zeros are not used.

**Examples:** None

## G1283

<b>Statement:</b>	Use linked style sheets, do not use embedded styles.
<b>Rationale:</b>	Only by referencing an external file will you be able to update the look of an entire website with a single change. Also, by pulling style definitions out of the pages, they (web pages) will be smaller and faster to download.

### Derived From

### Justifies

### Referenced By

[Feel Aspects](#)

### Acquisition Phase

Development

### Evaluation Criteria:

1. **Test:** *Does a web page use the <LINK> tag to include external style sheets instead of embedding styles?*

**Procedure:** View the source of the HTML page. The header tag (<head>) should contain links to external style sheet (.css) files. The header tag should not contain any <style> tags.

**Examples:** Correct usage:  
External style:

```
<head>
<link rel=stylesheet href="style.css"
type="text/css" media=screen>
<link rel=stylesheet href="basic.css"
type="text/css" media=screen>
</head>
```

Incorrect usage:  
Embedded style:

```
<head>
<style type="text/css">
td{background:#ff0;}
</style>
</head>
```

## G1284

<b>Statement:</b>	Use only one font for body text.		
<b>Rationale:</b>	Users may not have a wide variety of fonts available in their browser, so it is best to use a single, common font. The general standard is to make body text sans serif since most people find sans-serif fonts easier to read on monitors and serif fonts better for printed materials.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Feel Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<i>Does the HTML or style sheet refrain from using more than one font?</i>
		<b>Procedure:</b>	Search all web pages and style sheets for the word “font”. Make sure only one type of font is used for body text. May need to visually inspect web pages to see if a defined font style is used within the body.
		<b>Examples:</b>	<p>Correct usage:</p> <p>Cascading style sheet:</p> <pre>.body-main{font:sans-serif;}</pre> <p>HTML:</p> <pre>&lt;body style="main"&gt;</pre> <p>Incorrect usage:</p> <pre>Several font styles are used within a body.</pre>



## G1285

<b>Statement:</b>	Do not use absolute font sizes.
<b>Rationale:</b>	Users' browser settings will be customized and vary. Setting absolute font sizes may make the page unreadable. It annoys users to click on the "make text bigger" button and have nothing happen because the font sizes were defined as an absolute number of points.

### Derived From

### Justifies

### Referenced By

[Feel Aspects](#)

### Acquisition Phase

Development

### Evaluation Criteria:

- Test:** *Are any absolute font sizes utilized?*

**Procedure:** Search all web pages and style sheets for the word "font". Inspect the results to make sure no fixed fonts are used (e.g. 12pt).

**Examples:** Correct usage:

Relative or no font sizes settings are used.

Cascading style sheets:

```
p{font-size:200%;}
p{font-size:2em;}
```

Incorrect usage:

Cascading style sheets:

```
p{font-size:12pt;}
```

HTML (the font attribute should not be used at all within HTML code, only external style sheets):

```
<font size=1>size=1</font>
<font size=2>size=2</font>
<font size=3>size=3</font>
<font size=4>size=4</font>
<font size=5>size=5</font>
<font size=6>size=6</font>
<font size=7>size=7</font>
```

## G1286

<b>Statement:</b>	All buttons must have text labels.		
<b>Rationale:</b>	Users should not be forced to interpret the meaning of an image on a button.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Feel Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Do all buttons contain text labels?</i>
		<b>Procedure:</b>	Search all web pages for the word “form” and make sure all the “value” attributes are set to text label.
		<b>Examples:</b>	Correct usage:
			<pre> &lt;form action="mailto:me@abc.com" method="post"&gt;  &lt;input type="submit" name="emailbut" value="Send feedback" /&gt;  &lt;/form&gt; </pre> <p>Incorrect usage: Using images only:</p> <pre> &lt;input type="image" src="send.gif" name=" emailbut"/&gt; </pre>

## G1287

<b>Statement:</b>	Provide feedback when an online transaction will require the user to wait.		
<b>Rationale:</b>	Users may think that the program has stopped running or malfunctioning.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Feel Aspects</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Does the system provide feedback during long processes?</i>
		<b>Procedure:</b>	Run the application and observe any processes that take longer than 10 seconds to complete. Observe if any status indication is provided to alert the user of the status.
		<b>Examples:</b>	None

## G1292

<b>Statement:</b>	Use text-based website navigation.		
<b>Rationale:</b>	Text-based navigation works better than image-based navigation because it enables users to understand the link destinations. Users with text-only browsers and browsers with deactivated graphics can see only text-based navigation options.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">User Experience</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Are there any instance where graphics are used for navigation?</i>
		<b>Procedure:</b>	Visually inspect all web pages and make sure navigation elements are textual.
		<b>Examples:</b>	None

## G1293

<b>Statement:</b>	Use descriptive labels for all clickable graphics.
<b>Rationale:</b>	Clickable images generally confuse users, especially images that contain only graphics. Some that contain both graphics and words are also confusing because users do not know if the images are clickable without using the mouse pointer.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">User Experience</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1.     <b>Test:</b>           <i>Do web pages contain clickable images?</i></p> <p>          <b>Procedure:</b>   Search all web pages for image (“img”) tags embedded inside link (“a”) tags. Visually inspect each image found in the search and make sure there is an associated text description.</p> <p>          <b>Examples:</b>    Correct usage:</p> <p style="padding-left: 40px;">Click myimage to go to <a href="http://www.mywebsite.com">www.mywebsite.com</a>  <code>&lt;A href="http://www.mywebsite.com"&gt;&lt;img src="myimage.gif"&gt;&lt;/a&gt;</code></p> <p>                              Incorrect usage:</p> <p style="padding-left: 40px;"><code>&lt;A href="http://www.mywebsite.com"&gt;&lt;img src="myimage.gif"&gt;&lt;/a&gt;</code></p>

## G1294

<b>Statement:</b>	Provide a site map on all websites.		
<b>Rationale:</b>	Shows explicit organization of the site. Inexperienced users do not readily form a mental model of the way that information is organized in a website, making it hard for them to recover from navigational errors.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">User Experience</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<i>Does the website have a site map?</i>
		<b>Procedure:</b>	Search all web pages for anything with the name “sitemap”, “site map” and “map”. Visually inspect the search results to make sure a site map is included.
		<b>Examples:</b>	None

## G1295

<b>Statement:</b>	Provide redundant text links for linked images and each active region of an image map.
<b>Rationale:</b>	Lets users navigate the web site even if their browser cannot display images.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">User Experience</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1. <b>Test:</b> <i>Do any web pages contain image maps or linked images?</i></p> <p><b>Procedure:</b> Search all web pages for images and visually inspect to make sure redundant text links exist for all active regions on image maps and redundant text links exist for all linked images.</p> <p><b>Examples:</b> Correct usage: Image map:</p>

```
<map name="myimagemap">
<area shape="rect1" coords="20,25,84,113"
href="rect1.html">
<area shape="rect2" coords="40,50,168,226"
href="rect2.html">
</map>
```

Redundant text links for image map:

```
<a href="rect1.html">rect1</a>
<a href="rect2.html">rect2</a>
Linked image:
<a href="http://www.mywebsite.com"></a>
```

Redundant text link for linked image:

```
<a href=" http://www.mywebsite.com"> mywebsite
</a>
```

Incorrect usage:

```
No redundant text links exist for linked images or
image maps.
```

## G1296

**Statement:** Do not use the refresh command in web pages.

**Rationale:** Refreshing the page confuses the users.

**Derived From**

**Justifies**

**Referenced By** [User Experience](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Does the refresh command appear in the web page?*

**Procedure:** Search all web pages for the word “meta” and examine the results to make sure “refresh” is not used. Within the tag.

**Examples:** Correct usage:

`No automatic refreshing of web pages.`

Incorrect usage:

`<META http-equiv="refresh" content="60">`



## G1300

**Statement:**

Secure all [endpoints](#).

**Rationale:**

You are only as secure as your weakest link. Therefore, all access points in an application should be secured. An endpoint is defined as an entry or an exit point of an application. Any access point can be vulnerable to attacks. For instance, if an application file reads configuration settings from a properties file, that file can be corrupted or incorrectly configured. This can cause incorrect behavior in the application. Also if component, module or application provides remote access or is part of any inter-process communications, these areas are vulnerable to attacks. For instance, if the application provides an external socket interface, does it validate commands being sent by the client?

This high level guidance covers all instances not covered by sub-level guidance found in other sections.

**Derived From**
**Justifies**
**Referenced By**

[General Application \(Security\)](#)

**Acquisition Phase**

Development

**Evaluation Criteria:**

1.     **Test:**           *Check application processing of data files (configuration files, properties files, preferences, xml, etc...).*

**Procedure:**   Does the application handle invalid configuration, provide appropriate defaults, and protect sensitive data.

**Examples:**
2.     **Test:**           *Check application handling of externally accessible API(s) and external ports.*

**Procedure:**   Verify sensitive data is protected, and verify all network base protocols validate commands and values.

**Examples:**

## G1301

**Statement:** Practice layered security.

**Rationale:** Application with layered security provides more protection against attacks. Combining multiple layers of security defenses can provide additional protection when one layer is broken.

This high level guidance covers all instances not covered by sub-level guidance found in other sections.

**Derived From**

**Justifies**

**Referenced By** [General Application \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:**

- Test:** *Check application processing of data files (configfiles, preferences, xml, etc...).*
- Check application handling of externally accessible API(s).*

**Procedure:**

**Examples:**

## G1302

**Statement:** Validate all inputs.

**Rationale:** Input validation is not limited to presentation tier (validate input fields). All external API(s) should validate inputs prior to use. Invalid inputs can exhaust resources such as memory, disk and processing.

This high level guidance covers all instances not covered by sub-level guidance found in other sections.

**Derived From**

**Justifies**

**Referenced By**

[General Application \(Security\)](#)

**Acquisition  
Phase**

Development

**Evaluation  
Criteria:**

1.     **Test:**           *Check application range validation of externally accessible API(s).*  
  
           **Procedure:**   Does the application use prefix or postfix validation (asserts) to verify input parameters.  
  
           **Examples:**  
       2.     **Test:**           *Check application handling of null values.*  
  
           **Procedure:**   Does the application provide proper handling for null input?  
  
           **Examples:**

## G1303

**Statement:** Audit errant behavior, application violations and use of application cryptographic features.

**Rationale:** Auditing / logging errant behavior and application violation can not only be a developer's best friend in finding the source of the problem but can also help in determining the extent of the problem. Without auditing violations, security problems many escape detection.

**Derived From**

**Justifies**

**Referenced By** [General Application \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Ensure application provides logging facilities and uses it to log errant application behavior.*

**Procedure:** Check to make sure all application exceptions are log for analysis. Make sure exceptions are not thrown away.

**Examples:**

## G1304

<b>Statement:</b>	Unit Test all code.
<b>Rationale:</b>	A high percentage of all security violations can be attributed to inadequate or non-existent unit testing. Hackers can take advantage of these
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">General Application (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Does project unit test the code base?</i> </li> <li> <b>Procedure:</b> Use a coverage tool to determine how much of the project's code have been tested.  Check for use of a unit testing framework (JUnit for example).         </li> <li> <b>Examples:</b> </li> </ol>

## G1305

**Statement:** Ensure the separation of [encrypted](#) and unencrypted information.

**Rationale:** Not separating encrypted and unencrypted information can cause the application to incur performance hits due to unnecessary encryption. It can also cause inconsistent application processing.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [General Application \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:**

- Test:**
- Procedure:**
- Examples:**

# G1306

**Statement:** [Identify](#) and [authenticate](#) users of the application.

**Rationale:** This ensure there is some traceability and also provides the first in a multilayer security system.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [General Application \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:**

1. **Test:** *Does the application require user certificates?*  
*Does the application authenticate with another service (LDAP, database or simple password)?*

**Procedure:**

**Examples:**

## G1307

**Statement:** Provide a security policy file.

**Rationale:** Security should not be an afterthought after the application have already been designed and implemented. A security policy file can go along way in ensuring that application security has been part of the design and implementation of the application. A security policy file can identify all the security measures that the application has laid out.

**Derived From**

**Justifies**

**Referenced By** [General Application \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Does project have Security Policy File?*

**Procedure:** Check for existence of a Security Policy file.

**Examples:**



## G1308

**Statement:** Applications handling unclassified medium value information in Moderately Protected Environments, unclassified high value information in Highly Protected Environments, and discretionary access control of classified information in Highly Protected Environments shall be [Public Key Enabled](#) to interoperate with DoD [Class 3 PKI](#).

**Rationale:** The guidance defines the application types require to support DoD class 3 PKI.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Public Key Infrastructure \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Is the application using a DoD class 3 PKI approved FIPS 140-1 cryptographic module?*

*Does the application comply with all PKI guidance in this document?*

**Procedure:** Check cryptographic module to see if it is a FIP 140-1 compliant.

**Examples:**

## G1309

<b>Statement:</b>	Applications handling high value unclassified information in Minimally Protected environments must be <a href="#">Public Key Enabled</a> to interoperate with DoD <a href="#">Class 4 PKI</a> .		
<b>Rationale:</b>	The guidance defines the application types require to support DoD class 4 PKI. <b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Public Key Infrastructure (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<p><i>Is the application using a DoD class 4 PKI approved FIPS 140-1 cryptographic module?</i></p> <p><i>Does the application comply with al l PKI guidance in this document?</i></p>
		<b>Procedure:</b>	Check cryptographic module to see if it is a FIP 140-1 compliant.
		<b>Examples:</b>	

# G1310

<b>Statement:</b>	Applications shall protect cryptographic objects and functions from tampering.		
<b>Rationale:</b>	<p>If cryptographic objects such as private keys, key store, and CA trusted certificates are not protected, the system is not secure.</p> <p><b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Public Key Infrastructure (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Are cryptographic objects protected?</i>
		<b>Procedure:</b>	<p>Is the private key protected?</p> <p>Is the key store protected?</p> <p>How are trust points installed and protected?</p> <p>How are keys generated and certificates obtained?</p>
		<b>Examples:</b>	<p>Use High Security Level setting in IE to ensure password protection is used. See <a href="https://infosec.navy.mil/PKI/installcerts.doc">https://infosec.navy.mil/PKI/installcerts.doc</a> for software certificate steps. See <a href="https://infosec.navy.mil/PKI/cacbrochurev5.doc">https://infosec.navy.mil/PKI/cacbrochurev5.doc</a> for CAC.</p>

## G1311

**Statement:** Applications must use [LDAP](#), [HTTP](#), or [HTTPS](#) when communicating with DoD [PKI](#).

**Rationale:** These are the DoD approved protocols and the only supported ones.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section (4.3.2.1). Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Public Key Infrastructure \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:**

1. **Test:** *Checks to make sure the application use only LDAP, HTTP, or HTTPS protocols used to communicate with DoD PKI?*

**Procedure:** Configure application to use HTTP.  
Have application access the DoD PKI GDS Directory (DoD411.chamb.disa.mil) via HTTP  
Repeat access to GDS using HTTPS and LDAP protocols.

**Examples:**

## G1312

<b>Statement:</b>	Application must be capable of being configured for use with the DoD <a href="#">PKI</a> .		
<b>Rationale:</b>	Application must be able configurable to accept certificates, load key stores with private key, add trust points, etc...		
	<b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section (4.4). Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Public Key Infrastructure (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Check to make sure the application is configurable to accept certificates, load key stores, and add trust points?</i>
		<b>Procedure:</b>	Does the application provide external configuration files, properties files, and configuration applications?  Tests of this requirement may involve inspections of user and administrator manual.
		<b>Examples:</b>	

## G1313

<b>Statement:</b>	Application must provide documentation for configuration and setup for use with the DoD <a href="#">PKI</a> .		
<b>Rationale:</b>	<p>If the application can not be configured or setup correctly, the application is insecure. Without detail documentation, personnel with little knowledge of security or PKI will have little chance of keeping the overall system secure.</p> <p><b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section (4.5). Version 1.0. July 13, 2000.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Public Key Infrastructure (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Make sure there is documentation (such as Standard Operating Procedures [SOPs]) on how to configure and setup the application to interoperate within the DoD PKI.</i>
		<b>Procedure:</b>	Verified by inspection of the SOPs and by a demonstration that the application performs as documented when the configuration guidance is followed.
		<b>Examples:</b>	Most application manuals have detailed instructions in enabling PKI (either under the heading “enabling SSL” or “certificates”).

## G1314

**Statement:** The application shall have the ability to import and export keys (software certificates only).

**Rationale:** The whole PKI system is predicated on the use of public-private key pair. So the ability to import and use private keys is critical to a functional PKI application.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section (4.5). Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By**

[Key Management \(Security\)](#)

**Acquisition Phase**

Development

**Evaluation Criteria:**

1. **Test:** *The ability of the application to import and keys associated with standard certificates for individuals shall be demonstrated*

**Procedure:** The application shall import at least one set of keys and certificates for each certificate type supported by the application. The applications shall demonstrate interoperability by performing representative subscriber and relying party operations with each certificate type and its related keys.

**Note:** The correctness of the exported file shall be verified through analysis.

**Examples:** Internet Explorer can import/export certificates using Tools -> Internet Options. Click on Internet tab and click on Certificates link. Import/Export options are located here.

Unix based Web servers keys are exported by making a copy of the keys file and placing it in a safe location.

## G1315

**Statement:** Applications shall use key pairs and [Certificates](#) created for individuals using DoD [PKI](#) methods and procedures defined by the [DoD Class 3 Public Key Infrastructure Interface Specification](#), Draft Specification, 13 January 2000 and the *Personal Information Exchange Syntax Standard*.

**Rationale:** The DoD PKI supports these standards for importing keys and certificates. If the key or certificate are not created or issued by approved DoD Certificate architecture, it can not be trusted to interoperate within the DoD network.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section (4.5). Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Key Management \(Security\)](#)

**Acquisition Phase** Development

- Evaluation Criteria:**
1. **Test:** *Make sure keys can be imported and exported using the DoD standard and that the application can accept DoD PKI Class 3 certificates*
  - Procedure:** Verify by importing and exporting to DoD PKI key store.  
Access the application using a DoD PKI Class 3 Certificate.
  - Examples:** For servers, verify that the application requires client side authentication. Access the application server using a DoD PKI certificate.



# G1316

**Statement:**

Applications shall protect [private keys](#).

**Rationale:**

Security for the private key will be completely under the subscriber's control. In order for the PKI system to stay secure, the private key must not be compromised. Protecting the private ensures that attackers can not decrypt secured data communications.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section (4.5). Version 1.0. July 13, 2000.

**Derived From**
**Justifies**
**Referenced By**

[Key Management \(Security\)](#)

**Acquisition Phase**

Development

**Evaluation Criteria:**

1. **Test:** *Check the applications use and storage of the private key.*

**Procedure:**

Check for root access to key store.

Check for password access to secure key store.

Check application access to secure key store.

Is the private key encrypted when not in use?

Does the private key stay in application memory permanently or is it stay in memory only to perform private key operations?

Are all copies of the private key destroyed when private key operation is complete?

If the private key is password protected, is the password randomly selected from the space of  $2^{56}$  possible passwords or is the password protected against brute force search attacks?

**Examples:**

Attempt to view the contents of the private key using a document viewer program.

## G1317

**Statement:** Applications shall store [Certificates](#) for subscribers (the owner of the [Public Key](#) contained in the [Certificate](#)).

**Rationale:** This will allow other parties to use the public key to encrypt messages sent to the application. This is ONLY for signed and/or encrypted e-mail.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section (4.5). Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Key Management \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Check for the availability of the public key from the Directory Server application.*

**Procedure:** See if it is possible to extract the public key certificate from the Directory Server application

**Examples:**

## G1318

**Statement:** Applications shall provide capability to manage and store [trust points \(Certificate Authority Public Key Certificates\)](#).

**Rationale:** This will ensure the certificate is valid and expedite verification of the certificate.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Key Management \(Security\)](#)

**Acquisition Phase** Development

- Evaluation Criteria:**
1. **Test:** *Check for the availability of the Certificate Authority public key from the application.*
  - Procedure:** View the application's trust list to verify DoD PKI Class 3 CA certificates are present.
  - Examples:** For Internet Explorer, one can view the DoD PKI Class 3 CA certificates by selecting:  
  
Tools -> Internet Options. Click on Internet tab and click on Publishers button. Click on Trusted Root Certification Authorities tab and scroll down to verify that the DoD PKI Class 3 CA certificates are present.  
  
Web server CA certificates can usually be viewed by the application's GUI. If a GUI is not offered, reference the application's manual in certificate management.

## G1319

<b>Statement:</b>	Application shall be able to recover data (key provided by the DoD <a href="#">PKI KRM</a> ).		
<b>Rationale:</b>	Applications may have the need to decrypt legacy information that the application originally encrypted.		
	<b>Note:</b>	This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.	
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Key Management (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<i>The application shall demonstrate its ability to recover a key provided by the DoD PKI KRM.</i>
		<b>Procedure:</b>	Can the application process legacy data encrypted with old keys?
		<b>Examples:</b>	

## G1320

<b>Statement:</b>	Applications shall use 128 bit <a href="#">symmetric keys</a> , 1024 bit <a href="#">asymmetric keys</a> .		
<b>Rationale:</b>	Strong encryption ensures that data can not be decrypted using modern day resources.		
	<b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Encryption Services (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<p><i>Check to make sure encryption levels are adequately configured.</i></p> <p><i>Check to verify that the application supports domestic(US) grade ciphers.</i></p>
		<b>Procedure:</b>	Check the server configuration and verify that the ciphers being used are 1024 and not 512.
		<b>Examples:</b>	<p>Web server ciphers can be verified under SSL portion of the configuration pages of the administration server.</p> <p>For Internet Explorer 5.0 and above, click the Help menu and then click the About Internet Explorer option. The About box will list the Cipher Strength.</p>

## G1321

**Statement:** Applications shall be capable of performing [Public Key](#) operations necessary to verify signatures on DoD [PKI](#) signed objects (viz., [Certificates](#), [CRLs](#), and [OCSP](#)).

**Rationale:** The application must verify the digital signature and check its validity against the current CRL maintained by an on-line repository (OCSP).

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

### Derived From

### Justifies

**Referenced By** [Encryption Services \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:**

1. **Test:** *Visually validate the signature.*  
*Check the validity of the certificate by either performing an OCSP query or downloading the appropriate CRL.*

**Procedure:** Verify that the application can validate the signature either by manual inspection or by corrupting the digital signature of the certificate.

Verify that the application can check the validity of the certificate by either downloading a CRL or by performing an OCSP query.

**Examples:** Make a back-up copy of the certificate. For Windows based applications, stop the application and edit the signature of the certificate and save the certificate. Start the application back up. The application should fail to start as the signature check will fail.

For validity checking, confirm a validity check of the certificate was performed by viewing the application's audit log.

## G1322

<b>Statement:</b>	Applications that interact with the DoD <a href="#">PKI</a> using <a href="#">SSL</a> (i.e., <a href="#">HTTPS</a> ) must be capable of encrypting and decrypting data using the <a href="#">Triple Data Encryption Algorithm (TDEA)</a> .		
<b>Rationale:</b>	Applications <b>should</b> use cryptographic modules approved under [FIPS 140], Level 1.		
	<b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Encryption Services (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Visually verify that the application uses TDEA for encrypting and decrypting data.</i>
		<b>Procedure:</b>	Inspect the application's configuration file to confirm that TDEA is used for encrypting and decrypting data.
		<b>Examples:</b>	Most server based applications have cipher related information stored under SSL, certificates, or security. Verify that TDEA is being used by the application.

## G1323

**Statement:** Applications using [Symmetric Encryption](#) must be capable of generating random [Symmetric Encryption](#) keys.

**Rationale:** If the application can not generate random keys, then it is vulnerable to attacks if attackers can determine the algorithm for generating the random symmetric encryption keys.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Encryption Services \(Security\)](#)

**Acquisition Phase** Development

- Evaluation Criteria:**
1. **Test:** *Check the method for generating the random seed.*
  - Procedure:** Verify that the random seed is generated. This may be achieved by viewing the application’s vendor documentation.
  - Examples:** Most server based applications either user MOD\_SSL or OPEN\_SSL. These two toolkits properly use random seed generators.  
  
Apache based servers may require the administrator to type random keystrokes on the keyboard. This process is generating the random seed.



## G1324

**Statement:** Applications shall protect [symmetric keys](#) for the life of their use.

**Rationale:** Symmetric keys are mainly used for each unique session. Not secure to reuse symmetric keys for recurring use unless the keys are encrypted for storage.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

### Derived From

### Justifies

**Referenced By** [Encryption Services \(Security\)](#)

**Acquisition Phase** Development

- Evaluation Criteria:**
1. **Test:** *Check to make sure symmetric keys are not used repeatedly.*
  - Procedure:** Verify that the symmetric keys are protected for the life of their use. This may be achieved by viewing the application's vendor documentation
  - Examples:** Most server based applications either user MOD\_SSL or OPEN\_SSL. These two toolkits properly protect the symmetric keys for the life of their use.

## G1325

<b>Statement:</b>	Applications shall encrypt <a href="#">symmetric keys</a> when not in use.		
<b>Rationale:</b>	Symmetric keys enable both sides of the conversation to have knowledge of the key for encryption. It can not be given out freely, which means if it is going to be stored for repeated use, it should be encrypted first before storage.		
	<b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Encryption Services (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Check to make sure symmetric keys are not stored unencrypted.</i>
		<b>Procedure:</b>	Visual inspection that the symmetric keys are not stored unencrypted.
		<b>Examples:</b>	

## G1326

**Statement:** Applications shall be capable of producing [SHA](#) digests of [messages](#) to support verification of DoD [PKI](#) signed objects.

**Rationale:** Symmetric keys enable both sides of the conversation to have knowledge of the key for encryption. It can not be given out freely, which means if it is going to be stored for repeated use, it should be encrypted first before storage.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By**

[Encryption Services \(Security\)](#)

**Acquisition  
Phase**

Development

**Evaluation  
Criteria:**

1.     **Test:**           *Check to make sure symmetric keys are using SHA digest.*
- Procedure:**   Visually validate that the SHA digest is used for symmetric keys.
- Examples:**   Most application servers allow one to configure the hash to SHA1. Please note that the default for most applications is MD5.

## G1327

**Statement:** The application shall be able to request and obtain new [Certificates](#) for subscribers.

**Rationale:** If the application generates subscriber keys, the application shall demonstrate the ability to generate keys, request new certificates, and obtain new certificates through interaction with the DoD PKI. If the generated keys are for encryption applications, the application shall demonstrate its ability to provide keys to the DoD PKI KRM.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section 4.3.2.2 Version 1.0. July 13, 2000.

### Derived From

### Justifies

**Referenced By** [Certificate Processing \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Check to make sure that the application can request and obtain new certificates for subscribers.*

**Procedure:** For application servers, verify that the application can successfully request a certificate via the appropriate certificate request page from a DoD PKI CA.  
  
For application servers, verify that the application can successfully download an issued certificate from a DoD PKI CA.

**Examples:** Instructions in obtaining a DoD PKI certificate for a user are available at <https://infosec.navy.mil/PKI/users.html>.  
  
Instructions for obtaining a DoD PKI certificate for web servers including Netscape, Lotus, and IIS is available at <https://infosec.navy.mil/PKI/training.html#general>.

## G1328

**Statement:** The application shall be able to retrieve [Certificates](#) and use them in relying party operations.

**Rationale:** The ability to retrieve certificates from DoD certificates repositories further ensures the certificates authenticity.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section 4.3.2.3 Version 1.0. July 13, 2000.

### Derived From

### Justifies

**Referenced By** [Certificate Processing \(Security\)](#)

### Acquisition Phase

Development

### Evaluation Criteria:

1.     **Test:**         *Verify the application can obtain certificates from a DoD PKI certificate repository.*
- Procedure:**     Verify that the application can communicate with a DoD PKI certificate repository such as GDS.
- Examples:**     This test procedure is only required for applications that must send encrypted e-mail. For this scenario, assume that Outlook is used. Instructions for using Outlook 2000 is available at [https://infosec.navy.mil/PKI/Outlook\\_2000\\_0704.pdf](https://infosec.navy.mil/PKI/Outlook_2000_0704.pdf)

## G1329

<b>Statement:</b>	Application shall be able to check <a href="#">Certificate</a> status.
<b>Rationale:</b>	Applications must verify the validity of the certificate prior to establishing trust with the other entity. The DoD supports two mechanisms for validating certificates, CRL(s) or OSCP. CRL(s) will be the legacy system and applications should favor OSCP for new development.
<b>Note:</b>	This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section 4.3.2.4. Version 1.0. July 13, 2000.

### Derived From

### Justifies

### Referenced By [Certificate Processing \(Security\)](#)

### Acquisition Phase

### Evaluation Criteria:

- Development
- Test:** *CRL: See sublevel guidance [[G1330](#)].*

**Procedure:** Verify that the application is successfully downloading a CRL.

**Examples:** Visually inspect the application is configured to use CRLs for validity checking. This can be achieved by looking at the directory in which the application stores the CRLs.
  - Test:** *OSC Responder: See sublevel guidance [[G1331](#)].*

**Procedure:** Verify that the application is successfully performing OSCP queries to an OSCP Responder.

**Examples:** Visually inspect the application is configured to use OSCP for validity checking. This can be achieved by looking at the configuration file to see that the application is configured to use OSCP. One can also visually look at the application's log file to validate that the application is making OSCP queries.

## G1330

<b>Statement:</b>	Application shall be able to perform status checking using retrieve <a href="#">Certificate Revocation List (CRL)</a> or <a href="#">Online Certificate Status Protocol (OCSP)</a> .
<b>Rationale:</b>	Applications must verify the validity of the certificate prior to establishing trust with the other entity. CRL is the legacy mechanisms for validating certificates. Applications should favor OCSP for new development. This is the sublevel guidance to <a href="#">[G1329]</a> .
<b>Note:</b>	This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section 4.3.2.4.1 Version 1.0. July 13, 2000.

### Derived From

### Justifies

**Referenced By** [Certificate Processing \(Security\)](#)

**Acquisition Phase** Development

<b>Evaluation Criteria:</b>	<p><b>1. Test:</b> <i>CRL:</i></p> <p><i>Applications operating in environments with network connectivity to a CRL distribution point should be able to obtain a current CRL. Applications should be able without user intervention to obtain a current CRL to check the status of a certificate that contains a CRL distribution point extension (see [IF]). Applications with network connectivity unable to automatically find CRL distribution points should be capable of being configured with a distribution point that the application then uses to obtain CRLs as needed. Applications shall be capable of accepting a CRL for use in certificate status checking.</i></p> <p><b>Procedure:</b> Verify that the application is successfully downloading a CRL.</p> <p><b>Examples:</b> Visually inspect the application is configured to use CRLs for validity checking. This can be achieved by looking at the directory in which the application stores the CRLs.</p>
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## G1331

**Statement:** Application shall be able to retrieve [Certificates](#) and [CRL](#) from archive (directory service).

**Rationale:** Applications must verify the validity of the certificate prior to establishing trust with the other entity. CRL is the legacy mechanisms for validating certificates. Applications should favor OSCP for new development. This is the sublevel guidance to [\[G1329\]](#).

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section 4.3.2.4.2 Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Certificate Processing \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:**

1. **Test:** *OSCP Responder:*  
  
*Applications may use an OSCP responder to check the status of a particular certificate when the DoD and/or Navy has an operational responder. Applications shall prepare and transmit the request to the responder using HTTP in accordance with the DoD Class 3 PKI Infrastructure Interface Specification, Draft Specification. The application shall be able to accept OSCP responses.*

**Procedure:** Verify that the application is successfully performing OSCP queries to an OSCP Responder.

**Examples:** Visually inspect the application is configured to use OSCP for validity checking. This can be achieved by looking at the configuration file to see that the application is configured to use OSCP. One can also visually look at the application's log file to validate that the application is making OSCP queries.



## G1332

**Statement:** [Certificate](#) signatures shall be verified using the [Certificate](#) issuer's [Public Key](#).

**Rationale:** Applications will be able to verify the authenticity of the data stored in the certificate.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

### Derived From

### Justifies

**Referenced By** [Certificate Processing \(Security\)](#)

### Acquisition Phase

Development

### Evaluation Criteria:

1. **Test:** *Verify that the certificate was issued by a DoD PKI Class 3 CA.*

**Procedure:** Visually verify the application's certificate was issued by a DoD PKI Class 3 CA.

**Examples:** Most applications have a GUI to view the application's certificate. View the certificate and look at the issuer's Distinguished Name and associated Serial Number. Next, check the issuer's certificate and verify that the Serial Number is the same as the one in the application's certificate.

## G1333

<b>Statement:</b>	<a href="#">Certificate</a> 's effective date shall fall within the <a href="#">Certificate</a> 's validity period.		
<b>Rationale:</b>	Expired certificates should not be accepted except in cases where legacy data was archived.		
	<b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Certificate Processing (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Verify that the certificate has not expired and is within the certificate's validity period.</i>
		<b>Procedure:</b>	Visually inspect the certificate's validity dates. The certificate should be valid and not expired.
		<b>Examples:</b>	Each digital certificate has a lifetime. When viewing a certificate, the certificate will have a valid from date and a valid to date. The current date should fall within this range.

## G1334

**Statement:** Applications shall ensure that the intended use of the [Certificate](#) is consistent with the extensions.

**Rationale:** DoD PKI certificates support extensions which are used to indicate different levels of standard bodies or organizations. Applications use of the certificate should be consistent with the organization in which serves.

**Note:** This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

**Derived From**

**Justifies**

**Referenced By** [Certificate Processing \(Security\)](#)

**Acquisition Phase** Development

- Evaluation Criteria:**
1. **Test:** *The applications must support the extensions used by the DoD PKI.*
  - Procedure:** Verify that the application supports the extensions used by the DoD PKI.
  - Examples:** Reference Appendix D in the Interface Specification to determine what extensions are required for the application.

## G1335

<b>Statement:</b>	Applications shall be capable of being configured to operate with only DoD <a href="#">PKI trust points</a> .		
<b>Rationale:</b>	DoD trust points ensure certificates are chained to the issuer of the certificate and are authentic.		
	<b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Certificate Processing (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>The application is configured to operate with only DoD PKI Trust Points (CA certificates)</i>
		<b>Procedure:</b>	Visually inspect that only the DoD PKI certificates are trusted by the application.
		<b>Examples:</b>	Applications typically allow one to view the trust points via the administrative interface to the application. CA certificates are typically located under Certificate Management, SSL, or Security.

## G1336

<b>Statement:</b>	The application shall demonstrate its ability to store DoD <a href="#">PKI trust points</a> .
<b>Rationale:</b>	Applications are public keys of issuing authority. It is a trusted link the chain of certificates. It expedites the certificate validation process because if the certificate is trusted, then any link the path to ROOT certificate is trusted.  <b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section 4.3.1.3 Version 1.0. July 13, 2000.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Certificate Processing (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>The application can install and trust DoD PKI trust points from the intermediate CAs to the Root certificate.</i>   <b>Procedure:</b> Visually inspect that the intermediate DoD PKI CA certificates and the DoD PKI Root certificate are located in the application's trusted root database.   <b>Examples:</b> Applications typically allow one to view the trust points via the administrative interface to the application. CA certificates are typically located under Certificate Management, SSL, or Security. </li> </ol>

## G1337

<b>Statement:</b>	Application shall be capable of path development and path processing.		
<b>Rationale:</b>	Path development and path processing is critical to verifying the validity of the certificate.		
	<b>Note:</b> This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Section 4.3.4 Version 1.0. July 13, 2000.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Certificate Processing (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Check for application ability to verify a certificate.</i>
		<b>Procedure:</b>	Several paths will be provided for verifying the path processing capability. Both valid and invalid paths will be tested. Tests such as expired and revoked certificates, invalid signatures, broken chains, and improper use of extensions will be used. Certificates that do not satisfy the profile for DoD certificates will be used for verifying these requirements.
		<b>Examples:</b>	<p>In Internet Explorer, remove the DoD PKI Root certificate from the trust points. View an intermediate CA certificate and click on Certification Path. You will see that the path is invalid.</p> <p>View the validity period of a DoD PKI certificate. Set the clock forward to beyond this validity period. The application should indicate that the certificate has expired.</p>

## G1338

<b>Statement:</b>	Applications and <a href="#">Certificates</a> need to be able to support multiple organizational units.
<b>Rationale:</b>	DoD requirements dictate that certificates shall support multiple organizational units.
<b>Note:</b>	This guidance is derived from the DoD Class 3 PKI – Public Key-Enabled Application Requirements Document. Version 1.0. July 13, 2000.

### Derived From

### Justifies

**Referenced By** [Certificate Processing \(Security\)](#)

**Acquisition Phase** Development

<b>Evaluation Criteria:</b>	<p><b>1. Test:</b> <i>The application can process a certificate that contains multiple organizational units in the Distinguished Name.</i></p> <p><b>Procedure:</b> Visually inspect the DoD PKI CA certificates stored in the application. You will notice that each certificate contains multiple organizational units (OU=DoD, OU=PKI)</p> <p><b>Examples:</b> The majority of certificate request forms do not contain entries for multiple organizational units. In this case, include all of the organizational unit information in the single line. For example, for Navy, please enter the following information next to the Organizational Unit line: Navy, OU=DoD, OU=PKI.</p> <p>Once the certificate is issued, visually inspect this certificate to verify that the certificate contains these Organizational Unit values.</p>
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## G1339

**Statement:** Practice defensive programming by checking all method arguments.

**Rationale:** Data validation is not limited to Graphical User Interfaces. API(s) and library functions are also susceptible to corruption. The integrity of application can benefit from identifying invalid data as early as possible.

**Derived From**

**Justifies**

**Referenced By** [Application Programming Interface \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Check to make sure applications perform range validation.*

**Procedure:** Check for unit tests.  
Check thrown exceptions.

Purposely send invalid data to API(s) to test the integrity and handling of invalid data.

**Examples:**



## G1340

<b>Statement:</b>	Log all exceptional error conditions.		
<b>Rationale:</b>	Logging exceptional conditions that the application is not expecting can help in identifying security problems and trace or trigger security alerts.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Application Programming Interface (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Check to make sure applications perform logging of exceptional conditions.</i>
		<b>Procedure:</b>	Check exception handlers for logging support.
		<b>Examples:</b>	

## G1341

**Statement:** Use a security manager support to restrict application access to privileged system resources.

**Rationale:** Desktop applications by default do not install a security manager. Installing a security manager could prevent unsecured access to system resources such as network and file system. Desktop applications can benefit from using a security manager to ensure that system resources are protected.

**Derived From**

**Justifies**

**Referenced By** [Java API \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Check for the installation of security manager in the desktop application.*

**Procedure:** Check application main method for installation of a security manager.

**Examples:**

## G1342

<b>Statement:</b>	Class internal variable access should be restricted to the class.
<b>Rationale:</b>	One of the primary tenants in Object Oriented Programming is encapsulation. Restricting access to internal variables not only secure the Class / Object against corruption (no data validation), it is also a maintenance issue. Hiding the implementation details allows the flexibility of underlying implementation to change.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Java API (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Check classes for exposing internal data members.</i> </li> <li> <b>Procedure:</b> Make sure all internal class variables are declared private or protected. </li> <li> <b>Examples:</b> </li> </ol>

## G1343

**Statement:** Declare classes final to stop inheritance and prevent methods from being overridden.

**Rationale:** Utility classes and classes that do not intend to be extended (classes used for user authentication) should lock down their implementation. Locking implementation can prevent methods from being overridden. Not locking down implementation can cause corruption internal class data or allow errant code to run. For example, imagine the possibility of a class that perform credit card processing that can be overridden.

Class implementation can be lock down by declaring class final or methods final.

**Derived From**

**Justifies**

**Referenced By**

[Java API \(Security\)](#)

**Acquisition  
Phase**

Development

**Evaluation  
Criteria:**

1. **Test:** *Check sensitive, security related, and utility classes for final key use.*

**Procedure:** Check classes used in Security related processing (authentication, authorization) final keyword.  
  
Check classes that have sensitive data (social security numbers, medical data, and salary information) for final keyword.

Check Utility classes for final keyword.

**Examples:**

## G1344

<b>Statement:</b>	Encrypt sensitive data stored in configuration or resource files.
<b>Rationale:</b>	Sensitive data used for application configuration files (XML), user profiles, or resource files should be protected from tampering. The sensitive data should be encrypted and or a message digest or checksum should be calculated to check for tampering. Application should handle generation, accessing and storing data to these files.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Application Resource Security</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Check to configuration files and user profiles to see if sensitive data are in the clear unencrypted.</i> </li> <li> <b>Procedure:</b> Check properties files, XML configuration files or user profiles for sensitive data in the clear. Check for an application to edit, and creation of the file. </li> <li> <b>Examples:</b> </li> </ol>

## G1345

**Statement:** Bundle read only resources as part of the software and [digitally signed](#) the software bundle to prevent tampering.

**Rationale:** Static resources such as menu text, GUI labels, and error messages are often stored in resource bundles (properties files). To prevent tampering, these files should be bundled with the application. The library could be digitally signed which can be checked for tampering.

**Derived From**

**Justifies**

**Referenced By** [Application Resource Security](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Check library for resource files and the library has been digitally signed.*

**Procedure:** Make sure the library or application bundle contains all external read-only resources and does not exist outside of the application. Check for separate files.

For Java, check the jar files META-INF for digital signature information.

**Examples:**

## G1346

**Statement:** Audit database access.

**Rationale:** Auditing is critical for data access traceability. If the RDBMS was attacked, auditing is essential not only for figuring out what had occurred but also to recover lost data. Database access auditing logs each access of the database by a given user in an audit log. The log is aware of which database user made each change. But current middle tier based technology (e.g. J2EE, .Net, CORBA, etc.) shares connections and connection pools and may only have a single database user. Thus the burden is on the middle tier to know the identity of each user and be able to pass this information on the database (e.g., design each table to have data items such as updated by, created by, etc.)

New industry standards are emerging in which auditing will be used to trigger alarms.

**Derived From**

**Justifies**

**Referenced By** [Relational Database Management Systems \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:**

1. **Test:** *Actual user logging is not available automatically in DBMS systems. Only the database connection owner is known. For web based applications, often only the IP address of the user is known. Actual user access can only be determined if the application has user authentication and passes the user identity to the database for inclusion in the audit log.*

**Procedure:** Does the application database include actual user rather than database connection owner?

**Examples:**

## G1347

<b>Statement:</b>	Secure remote connections to database.
<b>Rationale:</b>	<p>Just because the database is behind the corporate firewall, does not mean someone inside the firewall can't not access or listen in on the wire.</p> <p>Net-centricity implies that a database should be on the network and not constrained to be sitting behind an application server. This means that many unanticipated users may eventually access the database. Thus database security should thus not be based on isolation.</p>
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Relational Database Management Systems (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1.      <b>Test:</b>           <i>Check to make sure data between database and client is secure.</i></p> <p>          <b>Procedure:</b>   Check for secure protocol between application and database. (SSL)</p> <p>                              Check for secure data access by IP address.</p> <p>                              Check for configuration in the database (user) which limit user from a specified host.</p> <p>          <b>Examples:</b></p>



## G1348

<b>Statement:</b>	Log database <a href="#">Transactions</a> .
<b>Rationale:</b>	Transaction logging is generally handled by the database management system and records all changes made to the database, critical for data recovery and traceability.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Relational Database Management Systems (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Make sure that database transactions are logged.</i> </li> <li> <b>Procedure:</b> Commercial database management systems have a feature to log database transactions. Check to determine whether the feature has been turned on in the database management system. </li> <li> <b>Examples:</b> </li> </ol>

## G1349

**Statement:** Validate all input that will be use as part of any dynamically generated [SQL](#).

**Rationale:** Not validating or filtering parameters used in dynamically generated SQL statements can lead to SQL injection attacks.

**Derived From**

**Justifies**

**Referenced By** [Relational Database Management Systems \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *Check for filtering or data validation code.*

**Procedure:** Filter out character like single quote, double quote, slash, back slash, semi colon, extended character like NULL, carry return, new line, etc, in all input strings.

**Examples:**

## G1350

<b>Statement:</b>	Implement a strong password policy for <a href="#">RDBMS</a> .
<b>Rationale:</b>	Clean database installation often contains no passwords for root users. Also, new user accounts often defaults to no password or standard password. Having no passwords allows users access any data. Database users should always be given strong passwords. This implies a non null password, locking unused user accounts and ensuring that system user accounts are not using default passwords
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Relational Database Management Systems (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Check user table for passwords.</i>  <b>Procedure:</b> Check for null or empty values for passwords in the user table.            Use a commercially available or open source default password analysis tool to ensure that all user accounts do not retain default passwords and to ensure that all passwords are strong.  <b>Examples:</b> </li> </ol>

## G1351

<b>Statement:</b>	Enhance Database security by using multiple user accounts with constraints.
<b>Rationale:</b>	<p>Constrain access to individual tables and functions by creating multiple user accounts for an application and constraining the accounts to specific functions. As a general policy, user accounts should be constrained to the minimal required database access. For example, creation of a read only account should be constrained by granting only select on the tables of interest to the read only user. This aids in password management as well as limiting the potential impact of SQL injection attacks. By granting only insert on a table, for example, and not granting select, the user could in effect create a write only database.</p> <p>Each application will have different requirements in regards to grants and access to tables. If one application is compromised, it will not affect the other applications.</p> <p>It also has traceability to determine which application has allowed a security violation.</p>
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Relational Database Management Systems (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1.      <b>Test:</b>      <i>Check each database application user to ensure that the account constraints are in accordance with the user function.</i></p> <p>         <b>Procedure:</b>    Are there read-only accounts for read-only applications such as reports?</p> <p>                            Do accounts have unwarranted privileges (such as DBA access)?</p> <p>                            Does each application making use of a database have its on set of database user accounts?</p> <p>         <b>Examples:</b></p>

## G1352

<b>Statement:</b>	Use database clustering and RAID for high availability of data.		
<b>Rationale:</b>	Database clusters combined with RAID technology (e.g., data striping and mirroring) can help ensure continued operation of a system that suffers hardware or software failure.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Relational Database Management Systems (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Make sure the system is designed to support high availability.</i>
		<b>Procedure:</b>	Check for the existence of a cluster and/or failover capability.  Check for the existence of RAID data storage for the database.
		<b>Examples:</b>	

G1353

Statement:	Use read only, and write only databases for sensitive data.		
Rationale:	Large web sites such as Amazon use write only database to protect sensitive data such as credit cards. This ensures that sensitive data can not be read externally. Separate internal applications can continue to process the data.		
Derived From			
Justifies			
Referenced By	<a href="#">Relational Database Management Systems (Security)</a>		
Acquisition Phase	Development		
Evaluation Criteria:	1.	Test:	<i>Make sure sensitive data is not readable, and modifiable externally by the application.</i>
		Procedure:	Check the access rights in user tables.
		Examples:	

## G1354

<b>Statement:</b>	Authenticate data using row or column level <a href="#">Encryption</a> .
<b>Rationale:</b>	For sensitive data, row or column level encryption should be used to protect the data. This cost nothing to the application developer and is more a function of the database design. The database automatically handles the encryption and decryption transparently of the application needing to support it. This will protect sensitive data in cases where the database has been compromised. The data will be encrypted so it can't be used.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Relational Database Management Systems (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Make sure sensitive data either column or row has been created with encryption support (database dependent).</i> </li> <li> <b>Procedure:</b> <p>Check to make sure the database supports row and column level encryption.</p> <p>Check the column attributes or table attributes to make sure that encryption has been enabled.</p> </li> <li> <b>Examples:</b> </li> </ol>

## G1356

<b>Statement:</b>	Use <a href="#">SOAP</a> standard for all <a href="#">Web Services</a> .
<b>Rationale:</b>	The web services security specifications are designed as an extension of SOAP. The specs are unusable without SOAP.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">General Web Services (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>



## G1357

<b>Statement:</b>	Do not rely on transport level security like <a href="#">SSL</a> or <a href="#">TLS</a> .
<b>Rationale:</b>	Web Services inherently involve multiple intermediaries between the message sender and the ultimate destination. The intermediaries may not use transport level security.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">General Web Services (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## *G1358*

**Statement:** Turn on auditing and sign the audit logs.

**Rationale:** Auditing will help track all the activity that occurs on a service provider. A signed audit log will prevent hackers from covering their tracks after a break in.

**Derived From**

**Justifies**

**Referenced By** [General Web Services \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:**

**Procedure:**

**Examples:**

## G1359

<b>Statement:</b>	Do not place <a href="#">Web Service</a> security policies inside a <a href="#">UDDI</a> registry. Put all security policies in the <a href="#">WSDL</a> file.
<b>Rationale:</b>	UDDI registries are not enjoying the industry acceptance as anticipated. Using the WSDL will ensure interoperability and maintainability.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">General Web Services (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## *G1360*

<b>Statement:</b>	Use the <a href="#">XML</a> Infoset standard to serialize <a href="#">message</a> .
<b>Rationale:</b>	XML signatures rely on a character-by-character comparison for proper operations. A one character difference is a different result. So using a standard for serialization is very important to successful communications.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">General Web Services (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## *G1361*

<b>Statement:</b>	Service providers should place their canonicalization method inside the WSDL file as an assertion(portType binding or port).
<b>Rationale:</b>	This assures that all users have a consistent view of all non-critical information like line breaks, tabs and closing tags.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">General Web Services (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## *G1362*

**Statement:** Use very intensive input validation (using a [schema](#)).

**Rationale:** Prevent malicious agents from compromising the integrity of a service. (well-formed?).

**Derived From**

**Justifies**

**Referenced By** [General Web Services \(Security\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:**

**Procedure:**

**Examples:**

## *G1363*

<b>Statement:</b>	Do not use clear text passwords.
<b>Rationale:</b>	Prevents a hacker from intercepting and seeing a real password.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Authentication (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1364

**Statement:** Hash all passwords using the combination of a timestamp, a nonce and the password for each [message](#) transmission.

**Rationale:** Prevents a hacker from intercepting and using a clear-text-hashed password in his own message.

**Derived From**

**Justifies**

**Referenced By** [Authentication \(Security\)](#)

**Acquisition** Development

**Phase**

**Evaluation** 1. **Test:**

**Criteria:**

**Procedure:**

**Examples:**



## *G1365*

<b>Statement:</b>	Specify a timeout value for all security tokens.
<b>Rationale:</b>	Limits a hackers ability to intercept and use the entire security token (username, password, timestamp, password) in his own message.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Authentication (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## *G1366*

<b>Statement:</b>	Sign all <a href="#">message</a> .
<b>Rationale:</b>	Prevents hackers from changing intercepting and modifying a message.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Integrity (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1367

<b>Statement:</b>	Sign only the part of the <a href="#">message</a> that needs to be signed.
<b>Rationale:</b>	Allows message parts to be targeted at different intermediaries along the message path to the final destination.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Integrity (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1368

<b>Statement:</b>	Sign any part of a <a href="#">message</a> not <a href="#">encrypted</a> .
<b>Rationale:</b>	Prevents hackers from changing intercepting and modifying a message.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Integrity (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## *G1369*

<b>Statement:</b>	Sign all requests made to a security token service.
<b>Rationale:</b>	Prevents hackers from intercepting a message and requesting a security token.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Integrity (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

*G1370*

Statement:	Sign all <a href="#">WSDL</a> files.
Rationale:	Prevents hackers from changing parts of the WSDL file.
Derived From	
Justifies	
Referenced By	<a href="#">Integrity (Security)</a>
Acquisition Phase	Development
Evaluation Criteria:	<div>1.      <b>Test:</b></div> <div>         <b>Procedure:</b></div> <div>         <b>Examples:</b></div>

## *G1371*

<b>Statement:</b>	Use the <a href="#">Digital Signature Standard</a> for creating <a href="#">Digital Signatures</a> .
<b>Rationale:</b>	Following Industry standards ensure interoperability.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Integrity (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1372

<b>Statement:</b>	Use an X.509 <a href="#">Certificate</a> to pass a <a href="#">Public Key</a> .
<b>Rationale:</b>	This ensures that the owner passing the key is who he says.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Integrity (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>



## G1373

<b>Statement:</b>	<a href="#">Encrypt</a> all <a href="#">message</a> .
<b>Rationale:</b>	Prevents hackers from reading sensitive information.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Confidentiality (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1374

<b>Statement:</b>	<a href="#">Encrypt</a> only the part of the <a href="#">message</a> that needs to be <a href="#">encrypted</a> .
<b>Rationale:</b>	Allows message parts to be targeted at different intermediaries along the message path to the final destination.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Confidentiality (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1375

<b>Statement:</b>	Use <a href="#">Asymmetric Encryption</a> .
<b>Rationale:</b>	Most web services exchange very few messages so the fact that asymmetric encryption is computationally intensive is a non-issue. Symmetric encryption is more efficient but, it is done by sharing a secret key outside the SOAP message communication, which is less portable.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Confidentiality (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1376

<b>Statement:</b>	Do not <a href="#">encrypt</a> key elements that are needed for correct <a href="#">SOAP</a> processing.
<b>Rationale:</b>	This allows intermediaries to correctly process the XML without knowing how to perform decryption.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Confidentiality (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"><li><b>Test:</b></li><li><b>Procedure:</b></li><li><b>Examples:</b></li></ol>

## G1377

<b>Statement:</b>	All connections to the <a href="#">LDAP</a> repository must be performed using <a href="#">LDAP</a> 3.0.		
<b>Rationale:</b>	To ensure interoperability of the directory repository component by other consumers the use the industry proven LDAP standards is highly recommended. It is preferred that all interaction with this components use a SSL secure LDAP connection at port 636 to avoid any security by sending requests in the clear.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">LDAP (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Check the LDAP connection at port 389 by sending the command to the LDAP Bind Request Operation.</i>
		<b>Procedure:</b>	Send a simple BIND request to the directory. The function of the BIND operation is to initiate a protocol session between a client and the server, and to allow the authentication of the client to the server.
		<b>Examples:</b>	Add Bind Request code sample for LDAP.
	<b>2.</b>	<b>Test:</b>	<i>Check port 636 if supporting secure LDAP or SLDAP</i>
		<b>Procedure:</b>	Test the connection using...
		<b>Examples:</b>	Add Bind Request code sample for SLDAP.

# G1378

**Statement:** Encrypt the [LDAP](#) repository.

**Rationale:** To ensure security the LDAP repository must be encrypted to avoid outside attacks against the data in the datastore.

**Derived From**

**Justifies**

**Referenced By** [LDAP \(Security\)](#)

**Acquisition Phase** Development

- Evaluation Criteria:**
1.

**Test:**  
*Check the LDAP connection at port 389 by sending the command to the LDAP Bind Request Operation.*

**Procedure:**  
Send a simple BIND request to the directory. The function of the BIND operation is to initiate a protocol session between a client and the server, and to allow the authentication of the client to the server.

**Examples:**  
Add Bind Request code sample for LDAP.
2.

**Test:**  
*Check port 636 if supporting secure LDAP or SLDAP*

**Procedure:**  
Test the connection using...

**Examples:**

```
environ.put(Context.INITIAL_CONTEXT_FACTORY,
"com.sun.jndi.ldap.LdapCtxFactory");

environ.put(Context.PROVIDER_URL,
"ldap://localhost:636/");

environ.put(Context.SECURITY_AUTHENTICATION,
"EXTERNAL");

environ.put(Context.SECURITY_PROTOCOL, "ssl");

DirContext ctxt = new
InitialDirContext(environ);
```

## G1379

**Statement:** Must use [SAML](#) version 2.0.

**Rationale:** SAML 2.0 support XML assertions for support cross domain access and web services. The value to this type of access is the passing of an assertion eliminates to the need to create another account in another domain.

**Derived From**

**Justifies**

**Referenced By** [SAML \(Security\)](#)

**Acquisition** Development

**Phase**

**Evaluation** 1. **Test:**

**Criteria:**

**Procedure:**

**Examples:**

## G1380

<b>Statement:</b>	<a href="#">SAML</a> based rule engines should be based on <a href="#">XACML</a> 2.0 standards.		
<b>Rationale:</b>	XACML based rules can define the mechanism for creating the rule and policy set that enable meaningful authorization decisions. XAMCL is also integrated with SAML to support Role based access control or hierarchical resources, such as portions of XML documents.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">SAML (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Test the rules engine with a soap call.</i>
		<b>Procedure:</b>	Emulate a rule and run against rule engine using SOAP messaging.
		<b>Examples:</b>	



## G1381

<b>Statement:</b>	Encrypt all sensitive persistent data.
<b>Rationale:</b>	When data is persisted, there is always a chance that the security of the system that stores the data may be compromised. To minimize the risk, all sensitive data such as passwords and personal information should be encrypted when it is persisted.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Data Tier (Security)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b> <i>Is all sensitive data that is persisted encrypted?</i> </li> <li> <b>Procedure:</b> Look at all data stores and check for encrypted passwords and other sensitive data.. </li> <li> <b>Examples:</b> </li> </ol>

## G1382

<b>Statement:</b>	Be associated with one or more <a href="#">communities of interest (COI's)</a> .		
<b>Rationale:</b>	The DoD's Net-Centric Data Strategy emphasizes the establishment of communities of interest ( <a href="#">COI's</a> ). This strategy introduces management of data within communities of interest ( <a href="#">COI's</a> ) rather than standardizing <a href="#">data elements</a> across the DoD. Thus all DoD Programs must map to one of more <a href="#">COI's</a> . DoD Programs should participate in <a href="#">COIs</a> as a normal course of doing business. They will identify relevant <a href="#">COIs</a> ; actively collaborate with them to promote reuse and cross-coordination of <a href="#">metadata</a> ; sponsor participation of system developers in the <a href="#">COI</a> process and where appropriate contribute engineering expertise to the <a href="#">COI</a> as a stakeholder SOR. New programs will include community collaboration requirements in acquisition documents as required by NESI.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program been associated with a <a href="#">COI</a> (community of Interest)?</i>
		<b>Procedure:</b>	Check DoD Metadata registry to determine whether program is associated with <a href="#">COI</a> (s).
		<b>Examples:</b>	None

## G1383

<b>Statement:</b>	Use a <a href="#">registered namespace</a> in the <a href="#">XML Gallery</a> in the <a href="#">DoD Metadata Registry</a> .		
<b>Rationale:</b>	<p>The use of the <a href="#">DoD Metadata Registry</a> helps to avoid name collisions and conflicts.</p> <p>The assignation of a unique <a href="#">registered namespace</a> permits a program to be uniquely identified and categorized. The DoD's Net-Centric Data Strategy requires that data products be stored in shared spaces to provide access to all authorized users and that these data products be tagged with <a href="#">metadata</a> to enable discovery of data by authorized users. The use of a unique <a href="#">registered namespace</a> provides an absolute identifier to products associated with a particular product and is an <a href="#">XSD</a> schema requirement.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	1.	<b>Test:</b>	<i>Has the program been assigned a namespace for its XML data assets?</i>
		<b>Procedure:</b>	Check DoD Metadata registry to determine whether program is associated with <a href="#">COI</a> (s).
		<b>Examples:</b>	None

## G1384

<b>Statement:</b>	Review <a href="#">XML Information Resources</a> in the <a href="#">DoD Metadata Registry</a> using those which can be reused.		
<b>Rationale:</b>	<p>The DoD's Net-Centric Data Strategy requires that <a href="#">XML</a> information resources within a <a href="#">COI</a> in the <a href="#">DoD Metadata Registry</a> be examined by DoD projects for possible reuse to help foster common standards within a <a href="#">COI</a> and promote interoperability.</p> <p>Note that the proposed <a href="#">DoD Metadata Registry</a> tools have not been formally released. The Beta version thereof is in testing. Automatic Waivers of this requirement will be permitted until the tools are formally released.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the program reused information resources from the <a href="#">DoD Metadata Registry</a>?</i>
		<b>Procedure:</b>	Check the XSD's associated with the program to determine whether XSD's referenced by other namespaces have been used. Check the <a href="#">DoD Metadata Registry</a> to determine whether the Program has registered the reuse of XML information resources belonging to other namespaces. Reuse is indicated by formally subscribing to selected components in the registry.
		<b>Examples:</b>	None

## G1385

<b>Statement:</b>	I Identify <a href="#">XML Information Resources</a> for registration in the <a href="#">XML Gallery</a> of the <a href="#">DoD Metadata Registry</a> .		
<b>Rationale:</b>	The DoD's Net-Centric Data Strategy requires that <a href="#">XML Information Resources</a> developed during the course of a program be identified, examined for usefulness by other DoD Programs in the same or related <a href="#">COI</a> 's and be submitted for inclusion in the <a href="#">XML Gallery</a> of the <a href="#">DoD Metadata Registry</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the program submitted new information resources to the <a href="#">DoD Metadata Registry</a>?</i>
		<b>Procedure:</b>	Check the XSD's associated with the program namespace to determine whether they have been registered in the <a href="#">DoD Metadata Registry</a> XML Gallery.
		<b>Examples:</b>	None

## G1387

<b>Statement:</b>	Identify <a href="#">data elements</a> developed in the <a href="#">relational database</a> technology during the program for registering in the <a href="#">Data Element Gallery</a> of the <a href="#">DoD Metadata Registry</a> .		
<b>Rationale:</b>	The DoD's Net-Centric Data Strategy requires that <a href="#">data elements</a> developed during the course of a program be identified, examined for usefulness by other DoD Programs in the same or related <a href="#">COI</a> 's and be submitted for inclusion in the Data Element Gallery of the <a href="#">DoD Metadata Registry</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program submitted common database elements to the DoD Metadata registry?</i>
		<b>Procedure:</b>	Check the <a href="#">DoD Metadata Registry</a> Data Element Gallery to determine whether the program has submitted database elements for reuse.
		<b>Examples:</b>	None

## G1386

<b>Statement:</b>	Review predefined commonly used <a href="#">data elements</a> in the <a href="#">Data Element Gallery</a> of the <a href="#">DoD Metadata Registry</a> using those in the <a href="#">relational database</a> technology which can be reused in the program.		
<b>Rationale:</b>	The DoD's Net-Centric Data Strategy requires that data element information resources within a <a href="#">COI</a> in the <a href="#">DoD Metadata Registry</a> be examined by DoD Programs for possible reuse to help foster common standards within a <a href="#">COI</a> and promote interoperability. Elements include US State Codes and Country Codes. This reuse is to be done in preference to reuse existing industry standard <a href="#">data elements</a> or developing new <a href="#">data elements</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program reused common database elements?</i>
		<b>Procedure:</b>	Check the <a href="#">DoD Metadata Registry</a> Data Element Gallery to determine whether the program has registered database elements for reuse. Reuse is indicated by formally subscribing to selected components in the registry. Check the program database to see whether registered <a href="#">data elements</a> have been included therein.
		<b>Examples:</b>	None

## G1388

<b>Statement:</b>	Use predefined commonly used database tables in the <a href="#">DoD Metadata Registry</a> .		
<b>Rationale:</b>	The DoD's Net-Centric Data Strategy requires that data table information resources within a <a href="#">COI</a> in the <a href="#">DoD Metadata Registry</a> be examined by DoD Programs for possible reuse to help foster common standards within a <a href="#">COI</a> and promote interoperability. This reuse is to be done in preference to reuse existing industry standard <a href="#">data elements</a> or developing new <a href="#">data elements</a> . Some examples are: Country Code, US State Code, Purchase Order Type Code, Security Classification Code. These tables are found in the <a href="#">Reference Data Set</a> Gallery of the <a href="#">DoD Metadata Registry</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program reused common database tables?</i>
		<b>Procedure:</b>	Check the <a href="#">DoD Metadata Registry Reference Dataset Gallery</a> to determine whether the program has registered database tables for reuse. Reuse is indicated by formally subscribing to selected components in the registry. Check the program database to see whether registered data tables have been included therein.
		<b>Examples:</b>	None



## G1389

<b>Statement:</b>	Publish database tables which are of common interest by registering them in the <a href="#">Reference Data Set</a> Gallery of the <a href="#">DoD Metadata Registry</a> .		
<b>Rationale:</b>	The DoD's Net-Centric Data Strategy requires that data tables developed during the course of a program be identified, examined for usefulness by other DoD Programs in the same or related <a href="#">COI</a> 's and be submitted for inclusion in the <a href="#">Reference Data Set</a> Gallery of the <a href="#">DoD Metadata Registry</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program submitted common database tables to the DoD Metadata registry?</i>
		<b>Procedure:</b>	Check the <a href="#">DoD Metadata Registry</a> Reference Dataset Gallery to determine whether the program has submitted database tables for reuse.
		<b>Examples:</b>	None

## G1390

<b>Statement:</b>	Standardize on the terminology published by relevant <a href="#">COIs</a> listed in the <a href="#">Taxonomy Gallery</a> of the <a href="#">DoD Metadata Registry</a> .		
<b>Rationale:</b>	A <a href="#">taxonomy</a> partitions the body of knowledge associated with a <a href="#">COI</a> and defines the relationships among component parts. A <a href="#">taxonomy</a> permits classification of concepts associated with a <a href="#">COI</a> . This in turn provides categories and definitions for discovery tags which aids in information use and retrieval by authorized users. Program use of <a href="#">COI taxonomies</a> occurs in several places. 1) <a href="#">taxonomy</a> use to describe information services for discovery, 2) <a href="#">taxonomies</a> created by the <a href="#">COI</a> as a means to extend the <a href="#">DDMS</a> for data asset discovery, 3) <a href="#">taxonomies</a> used to support mediation		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program adhered to the standard taxonomies for the <a href="#">COI</a>'s associated with the program?</i>
		<b>Procedure:</b>	Check the <a href="#">DoD Metadata Registry</a> and <a href="#">Taxonomy Gallery</a> to determine whether <a href="#">taxonomies</a> exist for the <a href="#">COI</a> in which the program resides.
		<b>Examples:</b>	None

## G1391

<b>Statement:</b>	Identify <a href="#">taxonomy</a> additions or changes in conjunction with the <a href="#">COIs</a> during the program for potential inclusion in the <a href="#">Taxonomy Gallery</a> of the <a href="#">DoD Metadata Registry</a> .		
<b>Rationale:</b>	To maintain an accurate and effective taxonomy in a specific <a href="#">COI</a> , it is necessary for programs associated with the <a href="#">COI</a> to identify and submit potential taxonomy changes or additions to the <a href="#">DoD Metadata Registry</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program submitted taxonomy additions or changes to the DoD Metadata registry?</i>
		<b>Procedure:</b>	Check the <a href="#">DoD Metadata Registry</a> and <a href="#">Taxonomy Gallery</a> to determine whether the program has submitted taxonomy changes for reuse.
		<b>Examples:</b>	None

## G1392

<b>Statement:</b>	Adhere to a common mechanism of service location.		
<b>Rationale:</b>	Program information services are provided via a shared space for use by consumers. In order to locate these services and access the corresponding information provided, the services should be registered in the <a href="#">service registry</a> per direction of the shared information space manager.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Metadata Registry</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a> , <a href="#">ASD NII Checklist</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Has the Program generated default service definitions and registered them in the DoD <a href="#">service registry</a>?</i>
		<b>Procedure:</b>	Review that there is a service definition ( <a href="#">URL</a> 's, <a href="#">WSDL</a> entries, etc ) for each of the program information services and that they have been registered accordingly.
		<b>Examples:</b>	None

## G1405

<b>Statement:</b>	Establish a Workflow Design Pattern <a href="#">Repository</a> in the DoD environment.
<b>Rationale:</b>	Many DoD software development projects require the solution of a small number of standard problems. Typically, developers reinvent the same algorithm. Workflow Design Patterns provide a mechanism to capture standard problem solutions and make them available to the development community. This has the advantage of standardizing pattern nomenclature and saving development time.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Metadata (Mediation)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b>  <b>Procedure:</b>  <b>Examples:</b>     None </li> </ol>

## G1406

**Statement:** Use Design Patterns found in the DoD Workflow Design Pattern [Repository](#) for [web service](#) business process development.

**Rationale:** By standardizing on a predefined set of Design patterns, software developers in the DoD environment will promote reuse, simplify testing, simplify documentation, and reduce software errors.

**Derived From**

**Justifies**

**Referenced By** [Metadata \(Mediation\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:**

**Procedure:**

**Examples:** None

## G1407

<b>Statement:</b>	Add a mechanism to permit the addition of design patterns to the DoD Workflow Design Pattern <a href="#">Repository</a> .
<b>Rationale:</b>	When standard design pattern do not fit the task at hand and new patterns must be developed, ensure that these new patterns are added to the DoD Workflow Design Pattern <a href="#">Repository</a> . Note that a range of existing design patterns have been built into some of the business process languages and that it may not be possible to implement a new design pattern.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Metadata (Mediation)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b>  <b>Procedure:</b>  <b>Examples:</b>     None </li> </ol>





# *Best Practices Details*

## *Best Practices Details*

A NESI Best Practice is very similar to guidance except the definition of a Best Practice is not as rigorous. A Best Practice is **not** required to be:

- Absolute
- Definitive
- Testable
- Measurable

Best Practices are provided as “advice” to the program or project and can optionally have all the same parts as NESI Guidance. If a NESI Best Practice has evaluation Criteria, it can be required by a specific program or project and is completely at the discretion of the program or project. This type of situation is likely to occur when a NESI Guidance Statement covers an emerging or new standard.

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### *NESI Best Practices Example*

Examples can be provided as a reference for illustrative purposes for some or all of the Guidance Details and Best Practice Details provided within the Perspective. These are not to be confused with the detailed examples that are provided as part of the Evaluation Criteria.

This section contains a complete set of the numbered best practices that are referenced elsewhere in this guide.

## BP1038

<b>Statement</b>	Use one of these standard fonts in web pages, in this order of preference: Verdana, Universal, Sans Serif. Do not use Times New Roman.
<b>Rationale</b>	Web pages are easier to read with suggested fonts.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">GUI Design</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1039

<b>Statement</b>	Do not underline any text unless it is a link.
<b>Rationale</b>	Underlined text is the default behavior of an <a href="#">HTML</a> link. Many users consider this the norm and may find a <a href="#">web page</a> difficult to read if other items are underlined.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">GUI Design</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1040

<b>Statement</b>	Use hex codes for all colors (e.g., #FFFF33), never the color name (e.g., yellow). For an online hexadecimal color chart, see <a href="http://webmonkey.wired.com/webmonkey/reference/color_codes/">http://webmonkey.wired.com/webmonkey/reference/color_codes/</a> .
<b>Rationale</b>	Increases compatibility between browsers. Industry standard.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">GUI Design</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1041

<b>Statement</b>	Do not change the default colors of the links.
<b>Rationale</b>	<a href="#">Web pages</a> are easier to read because users have become accustomed to the default colors.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">GUI Design</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1042

<b>Statement</b>	Do not build a <a href="#">web page</a> where the horizontal width is greater than the screen. Vertical scrolling is fine. Plan for the lowest common denominator to be super-VGA resolution or 600 x 800.
<b>Rationale</b>	This enables you to print pages on most printers and render pages on most displays.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">GUI Design</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1054

<b>Statement</b>	Use standard controls that provide input choices for the user. These controls might include radio buttons, check boxes, list boxes, and drop-downs.
<b>Rationale</b>	Reduces user input errors.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1075

<b>Statement</b>	All application developers should use the <a href="#">ANT</a> build tool to build, package, and deploy <a href="#">J2EE</a> applications.
<b>Rationale</b>	There are several good <a href="#">IDEs</a> on the market to support developing J2EE applications. However, different IDEs tend to auto-generate code that does not port to other IDEs, creating a problem when sharing code between groups using different IDEs. To minimize these compatibility issues and development environment turf wars, common building tools need to be used.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Automate the Build Process</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None



## BP1076

<b>Statement</b>	When <a href="#">deploying</a> a new application to a WebLogic <a href="#">application server</a> (e.g., <a href="#">ear</a> , <a href="#">war</a> , <a href="#">rar</a> ), do not edit the WebLogic startup file to add application-specific information. This file is used for <a href="#">server</a> startup only and should not contain application-specific logic. The system administrator must approve and coordinate all updates to this file.
<b>Rationale</b>	Server startup should not depend on an individual application.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">J2EE environment</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1077

<b>Statement</b>	Do not edit the <b>config.xml</b> file manually. The <b>config.xml</b> file is the persistent store used by the WebLogic server to store runtime configuration parameters. Instead, use the WebLogic management console to configure the WebLogic <a href="#">server</a> . Any edits done through the management console will be written to <b>config.xml</b> .
<b>Rationale</b>	Editing the <b>config.xml</b> file manually can introduce unpredictable server errors and cause loss of important configuration data.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">J2EE environment</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1097

<b>Statement</b>	Use the <b>System.Text.StringBuilder</b> class for repetitive string modifications such as appending, removing, replacing, or inserting characters.		
<b>Rationale</b>	Strings in <a href="#">.NET</a> are immutable. This means that every time a string is created as a result of a string operation such as concatenation, a new string is created for each intermediate string in a set of operations. This has a lot of string management overhead. <b>StringBuilder</b> avoids these problems.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">.NET Framework</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are there repetitive string operations that use string operations instead of <b>StringBuilder</b> operations?</i>
		<b>Procedure</b>	Scan all C# code for repetitive string operations such as appending, removing, replacing, or inserting characters.
		<b>Examples</b>	None

## BP1098

<b>Statement</b>	Write all <a href="#">.NET</a> code in C#.		
<b>Rationale</b>	Because of the high degree of similarities between C# and Java, .NET code written in C# is easily ported to Java. .NET has removed most of the advantages of one language (C#, C++, J++, VB) over another.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">.NET Framework</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are any .NET languages delivered other than C#?</i>
		<b>Procedure</b>	Scan delivered code for registered .NET file extensions other than C#.
		<b>Examples</b>	None

## BP1100

<b>Statement</b>	Compile all code using the <a href="#">.NET Just-In-Time compiler</a> .		
<b>Rationale</b>	There are two different ways to generate machine code within the .NET environment: <a href="#">Just-In-Time (JIT)</a> and Native Image Generator (NGEN). The NGEN method provides performance advantages by using the native image cache portion of the global assembly cache, which is specific to the machine where the .NET <a href="#">common language runtime</a> is installed. It is machine-dependent and is less portable.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">.NET Framework</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is ngen.exe used?</i>
		<b>Procedure</b>	Scan all delivered code for the use of ngen.exe or the ngen command.
		<b>Examples</b>	None

## BP1109

<b>Statement</b>	Use Windows unattended setup to install Message Queuing software by remotely using an answer file.
<b>Rationale</b>	It should not be necessary to have a “human in the loop” when installing the Message queuing software. This reduces errors during installation and helps establish a uniform installation base.
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[BP1226]</a> , <a href="#">[BP1227]</a> , <a href="#">[BP1228]</a> , <a href="#">[BP1229]</a> , <a href="#">[BP1230]</a>
<b>Referenced By</b>	
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel best practices to evaluate this guidance.

## BP1111

<b>Statement</b>	Mark all MSMQ messages as recoverable.		
<b>Rationale</b>	MSMQ normally only stores the contents of messages in memory, which will be lost if a power, hardware, or software failure occurs. By marking messages as recoverable, messages are also stored to disk so the contents can be recovered after a failure.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are all messages and message queues marked as recoverable?</i>
		<b>Procedure</b>	Scan the code for the creation of messages and message codes, and make sure each has the <b>recoverable</b> attribute set to true.
		<b>Examples</b>	None

## BP1112

<b>Statement</b>	Specify all MSMQ queues as transactional if they support multiple-step processes.
<b>Rationale</b>	<a href="#">Transactions</a> allow multi-step processes to behave correctly when a <a href="#">rollback</a> occurs.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None



## BP1116

<b>Statement</b>	If using <a href="#">Java</a> -based messaging (e.g., <a href="#">JMS</a> ), register destinations in <a href="#">Java Naming and Directory Interface (JNDI)</a> so <a href="#">message clients</a> can use <a href="#">JNDI</a> to look up these destinations.
<b>Rationale</b>	JNDI is an industry standard for Java-based applications.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Message-based Applications, Java Naming &amp; Directory Interface (JNDI)</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1122

<b>Statement</b>	When using <a href="#">CORBA</a> strings, follow the best practice guidelines in the child documents listed below.
<b>Rationale</b>	Aids in memory management by reducing memory leaks and memory-related errors.
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[BP1231]</a> , <a href="#">[BP1232]</a> , <a href="#">[BP1233]</a> , <a href="#">[BP1234]</a> , <a href="#">[BP1235]</a>
<b>Referenced By</b>	<a href="#">CORBA</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel best practices to evaluate this guidance.

## BP1139

**Statement** Adhere to a core set of [SQL](#) features. Minimize use of proprietary extensions to the SQL standard.

**Rationale** It is almost impossible to use Oracle, SQL Server, or DB-2 without using proprietary extensions to the SQL standards. In many cases, however, these extensions are later incorporated into the standard.

**Derived From**

**Justifies**

**Referenced By**

**Acquisition Phase** Development

**Evaluation Criteria** 1. **Test** *Have the developers adhered to a core set of features and minimized use of proprietary extensions to the SQL standard?*

**Procedure** Examine a representative sample of database scripts and stored procedures.

**Examples** None

## BP1140

<b>Statement</b>	Use SQL-2003 features in preference to <a href="#">SQL-92</a> or <a href="#">SQL-99</a> .		
<b>Rationale</b>	SQL-2003 includes many <a href="#">XML</a> and <a href="#">OODB</a> extensions and features. Use it in preference to SQL-99 or SQL-92 entry-level features, to justify the recommendations against using native XML databases and OODB databases.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Have the developers used SQL-2003 features rather than SQL-92 or SQL-99 features?</i>
		<b>Procedure</b>	Examine a representative sample of database scripts and stored procedures.
		<b>Examples</b>	None

## BP1143

<b>Statement</b>	Use a <a href="#">database modeling</a> tool that supports a two-level model ( <a href="#">Conceptual/Logical</a> and <a href="#">Physical</a> ) and <a href="#">ISO-11179</a> data exchange standards.		
<b>Rationale</b>	<a href="#">ISO-11179</a> is a <a href="#">metadata</a> repository standard. The tools we have been using operate in a mode where the model is stored locally in an <a href="#">XML</a> file or in a vendor-specific repository. For many applications, there is no need to use the repository at all. <a href="#">Configuration Management</a> could be affected by checking the model in and out of a tool such as Source Safe. Entity-Relationship <a href="#">data model</a> is synonymous with a <a href="#">Conceptual Data Model</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Database Development</a> , <a href="#">Family of Interoperable Operational Pictures (FIOP)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is a database modeling tool being used and does it support the ISO-11179 data exchange standards?</i>
		<b>Procedure</b>	Verify that the requirement for a database modeling tool is included in the system requirements. If ISO-11179 standard-based <a href="#">metadata</a> repository products become available, determine whether the product provides an interface thereto.
		<b>Examples</b>	None

## BP1145

<b>Statement</b>	<a href="#">Conceptual and logical models</a> should be vendor-neutral whenever possible.		
<b>Rationale</b>	The leading database vendors do not have a common set of data types or object name length limitations, and there are no <a href="#">ANSI</a> standards that address these issues. To maintain vendor-neutral models, vendor-specific features will not be accepted.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Database Development</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Has the data model been designed using vendor-neutral design criteria?</i>
		<b>Procedure</b>	Examine the conceptual/logical data model.
		<b>Examples</b>	None

## BP1177

<b>Statement</b>	To ensure decoupling from the visualization layer, do not develop to the ATLAS <a href="#">APIs</a> . Develop to either the JMTK COE APIs, or to the <a href="#">OGC</a> open-standards APIs ( <a href="#">GO-1</a> : an OGC abstraction layer added to ATLAS that allows developers to use OGC GO-1/GEOBJECTSAPI calls and Geobjects). C2PC bindings allow developers to use either strategy.
<b>Rationale</b>	
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1226

<b>Statement</b>	Locate the Answer file for the MSMQ in the MSMQ installation directory on the computer from where the unattended setup will be initiated.		
<b>Rationale</b>	This allows the installation process to be consistently repeated. See ( <a href="#">MSMQ Concepts 3.6</a> ).		
<b>Derived From</b>	<a href="#">[BP1109]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is the answer file in the MSMQ installation directory?</i>
		<b>Procedure</b>	Find out where the MSMQ answer files are located. If the location is not provided, search for a file that contains one of the answer file settings listed in this guidance.
		<b>Examples</b>	None



## BP1227

<b>Statement</b>	Do not allow dependent clients to be installed.		
<b>Rationale</b>	<p>MSMQ-dependent clients require synchronous access to an MSMQ server and create performance issues on the server. Consequently, dependent clients cannot operate if they are disconnected from the rest of the <a href="#">enterprise</a> networks.</p> <p>Dependent clients cannot be run under local accounts.</p> <p>Dependent clients leave all encrypted messages in plain text between the client and server.</p>		
<b>Derived From</b>	<a href="#">[BP1109]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Is <b>msmq_LocalStorage</b> = ON in the MSMQ answer file?</i>
		<b>Procedure</b>	Scan the answer file for the setting.
		<b>Examples</b>	None
	2.	<b>Test</b>	<i>Is <b>SupportingServer</b> set in the MSMQ answer file?</i>
		<b>Procedure</b>	Scan the answer file for the setting.
		<b>Examples</b>	None

## BP1228

<b>Statement</b>	Do not use the features found in MSMQ v3.0 HTTP transport.		
<b>Rationale</b>	This is an extension of the Internet Information Services ( <a href="#">IIS</a> ) and should be avoided.		
<b>Derived From</b>	<a href="#">[BP1109]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Is <code>msmq_HTTPSupport</code> = <b>OFF</b> in the MSMQ answer file?</i>
		<b>Procedure</b>	Scan the answer file for the setting.
		<b>Examples</b>	None

## BP1229

<b>Statement</b>	Do not use the features found in MSMQ v3.0 message queue triggering.		
<b>Rationale</b>	This is an extension of the Internet Information Services ( <a href="#">IIS</a> ) and should be avoided.		
<b>Derived From</b>	<a href="#">[BP1109]</a>		
<b>Justifies</b>			
<b>Referenced By</b>			
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Is <code>msmq_TriggersService</code> = <b>OFF</b> in the MSMQ answer file?</i>
		<b>Procedure</b>	Scan the answer file for the setting.
		<b>Examples</b>	None

# BP1230

Statement	Do not use the SupportLocalAccountsOrNT4 feature.		
Rationale	This entry enables weakened security for Active Directory on a <a href="#">domain</a> controller, which is then replicated to all other domain controllers in every domain in your forest.  See ( <a href="#">MSMQ Concepts 3.6</a> )		
Derived From	<a href="#">[BP1109]</a>		
Justifies			
Referenced By			
Acquisition Phase	Development		
Evaluation Criteria	1.	Test	<i>Is <b>SupportLocalAccountsOrNT4</b> = <b>FALSE</b> in the MSMQ answer file?</i>
		Procedure	Scan the answer file for the setting.
		Examples	None

## BP1231

<b>Statement</b>	Use <code>CORBA::String_var</code> in <a href="#">IDL</a> to pass string types in C++.		
<b>Rationale</b>	To correct memory management and reduce memory leaks and runtime faults.		
<b>Derived From</b>	<a href="#">[BP1122]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">CORBA</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is <b>String_var</b> used in the implementation code that was not auto generated?</i>
		<b>Procedure</b>	Check implementation code that was not autogenerated for all occurrences of "string" and verify that they are <b>String_var</b> .
		<b>Examples</b>	None

## BP1232

<b>Statement</b>	Do not pass or return a zero or null pointer; instead, pass an empty string.		
<b>Rationale</b>	To correct memory management and reduce memory leaks and runtime faults.		
<b>Derived From</b>	<a href="#">[BP1122]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">CORBA</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1. Test</b>	<i>Are there any returns that contain pointers that are assigned zero?</i>	
	<b>Procedure</b>	Check code to make sure that all strings returned always have a safety check for zero or null pointers, and assign them to empty strings.	
	<b>Examples</b>	None	

## BP1233

<b>Statement</b>	Do not assign <code>CORBA::String_var</code> type to INOUT method parameters.	
<b>Rationale</b>	To correct memory management and reduce memory leaks and runtime faults.	
<b>Derived From</b>	<a href="#">[BP1122]</a>	
<b>Justifies</b>		
<b>Referenced By</b>	<a href="#">CORBA</a>	
<b>Acquisition Phase</b>	Development	
<b>Evaluation Criteria</b>	<b>1. Test</b>	Are there any <a href="#">IDL</a> implementation classes using methods that contain <code>CORBA::String_var</code> ?
	<b>Procedure</b>	Inspect CORBA code to make sure INOUT parameters are not assigned to <code>CORBA::String_var</code> values.
	<b>Examples</b>	None

## BP1234

<b>Statement</b>	Assign string values to OUT, INOUT, or RETURN parameters using operations to allocate or duplicate values rather than creating and deleting values.		
<b>Rationale</b>	Correct memory management and reduce memory leaks and reduce runtime faults.		
<b>Derived From</b>	<a href="#">[BP1122]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">CORBA</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are <b>string_dup</b>, <b>string_alloc</b> and <b>string_free</b> being used?</i>
		<b>Procedure</b>	Search CORBA code for the use of <b>string_dup</b> , <b>string_alloc</b> and <b>string_free</b> .
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Are new and delete operators being used for strings being assigned to OUT, INOUT or RETURN parameters?</i>
		<b>Procedure</b>	Inspect CORBA code to make sure OUT, INOUT, and RETURN parameters are not using strings managed with the new and delete operators.
		<b>Examples</b>	None



## BP1235

<b>Statement</b>	Assign string values to returned-as-attribute values using operations to allocate or duplicate values rather than creating and deleting values.		
<b>Rationale</b>	To correct memory management and reduce memory leaks and runtime faults.		
<b>Derived From</b>	<a href="#">[BP1122]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">CORBA</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are <b>string_dup</b>, <b>string_alloc</b> and <b>string_free</b> being used?</i>
		<b>Procedure</b>	Search <a href="#">CORBA</a> code for the use of <b>string_dup</b> , <b>string_alloc</b> and <b>string_free</b> .
		<b>Examples</b>	None
	<b>2.</b>	<b>Test</b>	<i>Are new and delete operators being used for strings being returned-as-attribute?</i>
		<b>Procedure</b>	Inspect CORBA code to make sure returned-as-attribute string values are not using strings managed with the new and delete operators.
		<b>Examples</b>	None

## BP1240

<b>Statement</b>	Present complete and coherent sets of concepts to the user.
<b>Rationale</b>	The <a href="#">interface</a> should not require the consumer to continually implement multiple interfaces when a single interface can accomplish the same thing.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Public Interface Design</a>
<b>Acquisition Phase</b>	Development

## BP1241

<b>Statement</b>	Design <a href="#">interfaces</a> to be statically typed.
<b>Rationale</b>	Designing a statically typed interface allows consumers to use early binding rather than late binding. This minimizes the risk for runtime errors due to late binding.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Public Interface Design</a>
<b>Acquisition Phase</b>	Development

## BP1242

<b>Statement</b>	Minimize the <a href="#">interface's</a> dependencies on other <a href="#">interfaces</a> .
<b>Rationale</b>	Minimizing the dependency of an interface on other interfaces simplifies the use of the interface by consumers.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Public Interface Design</a>
<b>Acquisition Phase</b>	Development

## BP1243

<b>Statement</b>	Express <a href="#">interfaces</a> in terms of application-level types.
<b>Rationale</b>	Use application-level types to maintain the meaning of values used with the interface. This enables data validation and other runtime safety checks against the data.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Public Interface Design</a>
<b>Acquisition Phase</b>	Development

## BP1244

<b>Statement</b>	Use assertions only to aid development and <a href="#">integration</a> .		
<b>Rationale</b>	<p>Assertions allow you to evaluate Boolean expressions to determine if the code is executing within the proper operating constraints. For example, if a calculated temperature is supposed to be between -273 degrees and +1,000 degrees, you can test the results of the calculation with an assertion. Once the code is tested and/or integrated, this calculation no longer needs to occur after each calculation.</p> <p>Assertion execution is integrated into the <a href="#">compiler</a>. Consequently, you can add it into the executable or eliminate it by setting compiler options (i.e. switches). Assertions are therefore ideal for adding code that is useful during development or integration, but wasteful in delivered code.</p>		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Public Interface Design</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Do public methods that implement interfaces have assertions?</i>
		<b>Procedure</b>	Check all implementations of public interfaces to ensure that all public methods that are part of the interface do not use the <b>assert</b> command.
		<b>Examples</b>	<p>The following example shows a correct implementation of a public method in a public interface.</p> <pre> public interface NameInterface is public String getName ( int nameID ) Throws IllegalArgumentException {     /* precondition check */     if ( nameID &lt;= 0            nameID &gt; MAX_NAMES     )     { throw new IllegalArgumentException       ("Illegal id number: " + nameID);     }     . . .// Do the computation     return theResult; } // End getName  } // NameInterface </pre> <p>The following example shows an incorrect implementation of a public method in a public interface. Do not use the implementation exemplified by the red code.</p> <pre> public interface NameInterface is public String getName ( int nameID ) {     /* precondition check */     assert nameID &lt;= 0            nameID &gt; MAX_NAMES         : "Illegal id number: " + nameID);     ... . . .// Do the computation     return theResult; } </pre>

```
    } // End getName  
} // NameInterface
```

## BP1246

<b>Statement</b>	Java-based portlets should be based on <a href="#">JSR 168</a> .
<b>Rationale</b>	JSR 168 enables <a href="#">interoperability</a> between Java <a href="#">portlets</a> and <a href="#">portals</a> . This specification defines a set of <a href="#">APIs</a> for portal computing that addresses the areas of aggregation, <a href="#">personalization</a> , presentation, and security. <a href="http://www.jcp.org/en/jsr/detail?id=168">http://www.jcp.org/en/jsr/detail?id=168</a>
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">WEB Portals</a>
<b>Acquisition Phase</b>	Development



## BP1247

<b>Statement</b>	Encapsulate Java-based <a href="#">portlet</a> s in a <a href="#">WAR</a> file.
<b>Rationale</b>	Storing <a href="#">JSR-168</a> -compliant code in the portal container improves <a href="#">interoperability</a> and code reuse.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">WEB Portals</a>
<b>Acquisition Phase</b>	Development

# BP1248

Statement	Follow a naming conventions:		
Rationale	<p>The names of schemas, users, tables, and columns need to be unique and descriptive. Unfortunately, it is possible (but undesirable) to give the same name to multiple objects: for example, assigning the name “employee” to a database, table, and column. Many naming conventions get around this by appending a suffix that indicates the kind of object: for example, <b>Employee_Db</b>, <b>Employee_Tbl</b>, <b>Employee_Id</b>, <b>Employee_Indx</b>.</p> <p>Avoid generic column names such as “ID.” Systems often have many kinds of IDs, and even if the system really only does have a single ID, it will be more difficult to merge with other databases if they have also used the column name “ID.”</p> <p>Some DBMSs support mixed-case names of unlimited length, while others are case-insensitive. For portability, assume that names are case-insensitive and limited to 30 characters. Do not use reserved words from the <a href="#">SQL-92</a>, <a href="#">SQL:1999</a>, or SQL:2003 standards.</p>		
Derived From			
Justifies	<a href="#">[BP1249]</a> , <a href="#">[BP1250]</a> , <a href="#">[BP1251]</a> , <a href="#">[BP1252]</a> , <a href="#">[BP1253]</a> , <a href="#">[BP1254]</a>		
Referenced By	<a href="#">RDBMS Internals</a>		
Acquisition Phase	Development		
Evaluation Criteria	1.	Test	<i>Is there a naming convention?</i>
		Procedure	Check for the existence of a document that governs naming conventions, or look for patterns in the database metadata.
		Examples	Use database commands to look at the database metadata:  <pre>select username from all_users select table_name from user_tables select index_name from user_indexes</pre>

## BP1249

<b>Statement</b>	Do not use generic names for database objects such as databases, schema, users, tables, views, or indices.
<b>Rationale</b>	<p>Assigning generic names to user-defined objects within a database can lead to confusion and unexpected results. For example, naming a database “instance” within the <a href="#">RDBMS</a> database is confusing to the humans who have to read commands that reference the database. In addition, the RDBMS software may parse it incorrectly.</p> <p>Note: Although some RDBMS interpreters allow you to use a generic or reserved word to name objects if the name is surrounded with quotes, you should not do this either.</p>
<b>Derived From</b>	<a href="#">[BP1248]</a>
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	<p><b>1.Test</b>      <i>Are any generic names used for user-defined objects?</i></p> <p><b>Procedure</b>Examine the RDBMS metadata for generic names such as database, table, entity, column, attribute, select, view, etc.</p> <p><b>Examples</b></p> <pre>select table_name from user_tables where table_name in ('database','entity',...) select column_name from user_tab_columns where column_name in ('database','entity',...)</pre>

## BP1250

<b>Statement</b>	Use case-insensitive names for database objects such as databases, schema, users, tables, views, and indices.		
<b>Rationale</b>	The <a href="#">SQL</a> standard does not require names to be case-sensitive. Consequently, some DBMSs are not case-sensitive. Using case-sensitive names therefore makes portability more difficult.		
<b>Derived From</b>	<a href="#">[BP1248]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Are the names of database objects case-sensitive?</i>
		<b>Procedure</b>	Examine the database metadata for “run-on” names. If the database supports case-sensitive names, check to see if it is using camel-back capitalization.
		<b>Examples</b>	<code>EMPLOYEEBENEFITSTBL</code> <code>EmployeeBenefitsTbl</code>

# BP1251

Statement	Separate words with underscores.										
Rationale	The <a href="#">SQL</a> standard does not require names to be case-sensitive. Consequently, some DBMSs are not case-sensitive. Using case-sensitive names therefore makes portability more difficult. To avoid these problems, use underscores to separate words (employee_benefits_tbl) rather than camel-back capitalization (EmployeeBenefitsTbl).										
Derived From	<a href="#">[BP1248]</a>										
Justifies											
Referenced By	<a href="#">RDBMS Internals</a>										
Acquisition Phase	Development										
Evaluation Criteria	1.	Test	<i>Are underscores used between the words in the names of database objects?</i>								
		Procedure	Examine the database metadata and look for names that do not have underscores separating words.								
		Examples	<table><tr><td>EMPLOYEEBENEFITSTBL</td><td>versus</td></tr><tr><td>EMPLOYEE_BENEFITS_TBL</td><td></td></tr><tr><td>EmployeeBenefitsTbl</td><td>versus</td></tr><tr><td>Employee_Benefits_Tbl</td><td></td></tr></table>	EMPLOYEEBENEFITSTBL	versus	EMPLOYEE_BENEFITS_TBL		EmployeeBenefitsTbl	versus	Employee_Benefits_Tbl	
EMPLOYEEBENEFITSTBL	versus										
EMPLOYEE_BENEFITS_TBL											
EmployeeBenefitsTbl	versus										
Employee_Benefits_Tbl											

BP1252

Statement	Do not use names with more than 30 characters.		
Rationale	Not all DBMSs support unlimited name lengths. For example, Oracle limits object names to 30 characters. Therefore, using names longer than 30 characters can reduce portability by limiting the DBMSs that the system can be deployed on.		
Derived From	<a href="#">[BP1248]</a>		
Justifies			
Referenced By	<a href="#">RDBMS Internals</a>		
Acquisition Phase	Development		
Evaluation Criteria	1.	Test	<i>Are any of the database object names more than 30 characters in length?</i>
		Procedure	Examine the database metadata and look for names that are longer than 30 characters.
		Examples	<div>.....1.....2.....3.....4</div> <div>W2_EMPLOYEE_BENEFITS_FOR_FAMILIES_TBL</div>

## BP1253

<b>Statement</b>	Do not use the <a href="#">SQL:1999</a> or <a href="#">SQL:2003</a> reserved words as names for database objects such as databases, schema, users, tables, views, or indices.		
<b>Rationale</b>	Using reserved words as the names of database objects can cause ambiguities and errors. It limits your ability to upgrade or port the code to other systems.		
<b>Derived From</b>	<a href="#">[BP1248]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Are any of the <a href="#">SQL:1999</a> or <a href="#">SQL:2003</a> reserved words used to name objects in the database?</i>

**Procedure** Examine the database metadata for names that are in the list of [SQL:1999](#) or [SQL:2003](#) reserved words

**Examples** Look for any of these words:

```
ABS ABSOLUTE ACCESS ACQUIRE ACTION ADA ADD
ADMIN AFTER AGGREGATE ALIAS ALL ALLOCATE ALLOW
ALTER AND ANY ARE ARRAY AS ASC ASENSITIVE
ASSERTION ASUTIME ASYMMETRIC AT ATOMIC AUDIT
AUTHORIZATION AUX AUXILIARY AVG
BACKUP BEFORE BEGIN BETWEEN BIGINT BINARY BIT
BIT_LENGTH BLOB BOOLEAN BOTH BREADTH BREAK
BROWSE BUFFERPOOL BULK BY
CALL CALLED CAPTURE CARDINALITY CASCADE
CASCADED CASE CAST CATALOG CCSID CEIL CEILING
CHAR CHAR_LENGTH CHARACTER CHARACTER_LENGTH
CHECK CHECKPOINT CLASS CLOB CLOSE CLUSTER
CLUSTERED COALESCE COLLATE COLLATION COLLECT
COLLECTION COLLID COLUMN COMMENT COMMIT
COMPLETION COMPRESS COMPUTE CONCAT CONDITION
CONNECT CONNECTION CONSTRAINT CONSTRAINTS
CONSTRUCTOR CONTAINS CONTAINSTABLE CONTINUE
CONVERT CORR CORRESPONDING COUNT COUNT_BIG
COVAR_POP COVAR_SAMP CREATE CROSS CUBE
CUME_DIST CURRENT CURRENT_COLLATION
CURRENT_DATE CURRENT_DEFAULT_TRANSFORM_GROUP
CURRENT_PATH CURRENT_PATH CURRENT_ROLE
CURRENT_SERVER CURRENT_TIME CURRENT_TIMESTAMP
CURRENT_TIMEZONE
CURRENT_TRANSFORM_GROUP_FOR_TYPE CURRENT_USER
CURSOR CYCLE
DATA DATABASE DATALINK DATE DAY DAYS DB2GENERAL
DB2SQL DBA DBCC DBINFO DBSPACE DEALLOCATE DEC
DECIMAL DECLARE DEFAULT DEFERRABLE DEFERRED
DELETE DENSE_RANK DENY DEPTH Deref DESC
DESCRIBE DESCRIPTOR DESTROY DESTRUCTOR
DETERMINISTIC DIAGNOSTICS DICTIONARY DISALLOW
DISCONNECT DISK DISTINCT DISTRIBUTED DLNEWCOPY
DLPREVIOUSCOPY DLURLCOMPLETE DLURLCOMPLETEONLY
DLURLCOMPLETWRITE DLURLPATH DLURLPATHONLY
DLURLPATHWRITE DLURLSCHEME DLURLSERVER DLVALUE
DO DOMAIN DOUBLE DROP DSSIZE DUMMY DUMP DYNAMIC
EACH EDITPROC ELEMENT ELSE ELSEIF END END-EXEC
EQUALS ERASE ERRLVL ESCAPE EVERY EXCEPT
EXCEPTION EXCLUSIVE EXEC EXECUTE EXISTS EXIT
EXP EXPLAIN EXTERNAL EXTRACT
FALSE FENCED FETCH FIELDPROC FILE FILLFACTOR
```

FILTER FINAL FIRST FLOAT FLOOR FOR FOREIGN  
 FORTRAN FOUND FREE FREETEXT FREETEXTTABLE FROM  
 FULL FUNCTION FUSION  
 GENERAL GENERATED GET GLOBAL GO GOTO GRANT  
 GRAPHIC GROUP GROUPING  
 HANDLER HAVING HOLD HOLDLOCK HOST HOUR HOURS  
 IDENTIFIED IDENTITY IDENTITY\_INSERT IDENTITYCOL  
 IF IGNORE IMMEDIATE IMPORT IN INCLUDE INCREMENT  
 INDEX INDICATOR INITIAL INITIALIZE INITIALLY  
 INNER INOUT INPUT INSENSITIVE INSERT INT  
 INTEGER INTEGRITY INTERSECT INTERSECTION  
 INTERVAL INTO IS ISOBID ISOLATION ITERATE  
 JAR JAVA JOIN  
 KEY KILL  
 LABEL LANGUAGE LARGE LAST LATERAL LC\_CTYPE  
 LEADING LEAVE LEFT LESS LEVEL LIKE LIMIT LINENO  
 LINKTYPE LN LOAD LOCAL LOCALE LOCALTIME  
 LOCALTIMESTAMP LOCATOR LOCATORS LOCK LOCKSIZE  
 LONG LOOP LOWER  
 MAP MATCH MAX MAXEXTENTS MEMBER MERGE METHOD  
 MICROSECOND MICROSECONDS MIN MINUS MINUTE  
 MINUTES MOD MODE MODIFIES MODIFY MODULE MONTH  
 MONTHS MULTISET  
 NAME NAMED NAMES NATIONAL NATURAL NCHAR NCLOB  
 NEW NEXT NHEADER NO NOAUDIT NOCHECK NOCOMPRESS  
 NODENAME NODENUMBER NONCLUSTERED NONE NORMALIZE  
 NOT NOWAIT NULL NULLIF NULLS NUMBER NUMERIC  
 Numparts  
 OBID OBJECT OCTET\_LENGTH OF OFF OFFLINE OFFSETS  
 OLD ON ONLINE ONLY OPEN OPENDATASOURCE  
 OPENQUERY OPENROWSET OPENXML OPERATION  
 OPTIMIZATION OPTIMIZE OPTION OR ORDER  
 ORDINARILITY OUT OUTER OUTPUT OVER OVERLAPS  
 OVERLAY  
 PACKAGE PAD PAGE PAGES PARAMETER PARAMETERS  
 PART PARTIAL PARTITION PASCAL PATH PCTFREE  
 PCTINDEX PERCENT PERCENT\_RANK PERCENTILE\_CONT  
 PERCENTILE\_DISC PIECESIZE PLAN POSITION POSTFIX  
 POWER PRECISION PREFIX PREORDER PREPARE  
 PRESERVE PRIMARY PRINT PRIOR PRIQTY PRIVATE  
 PRIVILEGES PROC PROCEDURE PROGRAM PSID PUBLIC  
 QUERYNO  
 RAISERROR RANGE RANK RAW READ READS READTEXT  
 REAL RECONFIGURE RECOVERY RECURSIVE REF  
 REFERENCES REFERENCING REGR\_AVGX REGR\_AVGY  
 REGR\_COUNT REGR\_INTERCEPT REGR\_R2 REGR\_SLOPE  
 REGR\_SXX REGR\_SXY REGR\_SYY RELATIVE RELEASE  
 RENAME REPEAT REPLICATION RESET RESIGNAL  
 RESOURCE RESTORE RESTRICT RESULT RETURN RETURNS  
 REVOKE RIGHT ROLE ROLLBACK ROLLUP ROUTINE ROW  
 ROW\_NUMBER ROWCOUNT ROWGUIDCOL ROWID ROWNUM  
 ROWS RRN RULE RUN  
 SAVE SAVEPOINT SCHEDULE SCHEMA SCOPE SCRATCHPAD  
 SCROLL SEARCH SECOND SECONDS SECQTY SECTION  
 SECURITY SELECT SENSITIVE SEQUENCE SESSION  
 SESSION\_USER SET SETS SETUSER SHARE SHUTDOWN  
 SIGNAL SIMILAR SIMPLE SIZE SMALLINT SOME SOURCE  
 SPACE SPECIFIC SPECIFICTYPE SQL SQLCA SQLCODE  
 SQLERROR SQLEXCEPTION SQLSTATE SQLWARNING SQRT  
 STANDARD START STATE STATEMENT STATIC  
 STATISTICS STAY STDDEV\_POP STDDEV\_SAMP STOGROUP  
 STORES STORPOOL STRUCTURE STYLESUBPAGES  
 SUBSTRING SUCCESSFUL SUM SYMMETRIC SYNONYM  
 SYSDATE SYSTEM SYSTEM\_USER  
 TABLE TABLESPACE TEMPORARY TERMINATE TEXTSIZE  
 THAN THEN TIME TIMESTAMP TIMEZONE\_HOUR  
 TIMEZONE\_MINUTE TO TOP TRAILING TRAN  
 TRANSACTION TRANSLATE TRANSLATION TREAT TRIGGER  
 TRIM TRUE TRUNCATE TSEQUAL TYPE  
 UID UNDER UNDO UNION UNIQUE UNKNOWN UNNEST  
 UNTIL UPDATE UPDATETEXT UPPER USAGE USE USER



USING  
VALIDATE VALIDPROC VALUE VALUES VAR\_POP  
VAR\_SAMP VARCHAR VARCHAR2 VARIABLE VARIANT  
VARYING VCAT VIEW VOLUMES  
WAITFOR WHEN WHENEVER WHERE WHILE WIDTH\_BUCKET  
WINDOW WITH WITHIN WITHOUT WLM WORK WRITE  
WRITETEXT  
YEAR YEARS  
ZONE

## BP1254

<b>Statement</b>	For <a href="#">command-and-control</a> systems, use the names defined in the <a href="#">C2IEDM</a> for data exposed to the outside communities.		
<b>Rationale</b>	The <a href="#">command-and-control (C2)</a> <a href="#">COI</a> has developed a <a href="#">data model</a> to facilitate the exchange of data within the community and by consumers of their data outside the community. Therefore, data that is to be exposed from the database to the <a href="#">COI</a> community or its data consumers should defer to the <a href="#">data model</a> whenever possible. The <a href="#">data model</a> defines the data units as well as the names and structure of the data.		
<b>Derived From</b>	<a href="#">[BP1248]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">RDBMS Internals</a> , <a href="#">Data Modeling</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>If this is a <a href="#">C2</a> system, does it use <a href="#">C2IEDM data elements</a> for the data that is exposed to the outside world?</i>
		<b>Procedure</b>	Review all the data that is exposed to the outside world and confirm that it conforms to the C2IEDM specifications.
		<b>Examples</b>	None.

## BP1255

<b>Statement</b>	Use <a href="#">surrogate keys</a> .
<b>Rationale</b>	<p>A surrogate key, also referred to as a system-generated key, database-sequence number, or arbitrary unique identifier, is a unique, arbitrary <a href="#">primary key</a>. It is usually generated by the <a href="#">RDBMS</a>, but can also be generated by a database access layer such as the middle tier. It is arbitrary because it is not derived from any data that exists within the table or the database. Some other options for surrogate keys are:</p> <p>Universally Unique Identifiers (UUIDs)  <a href="http://en.wikipedia.org/wiki/Universally_Unique_Identifier">http://en.wikipedia.org/wiki/Universally_Unique_Identifier</a></p> <p>Globally Unique Identifiers (GUIDs)  <a href="http://en.wikipedia.org/wiki/Globally_Unique_Identifier">http://en.wikipedia.org/wiki/Globally_Unique_Identifier</a></p>
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[BP1256]</a> , <a href="#">[BP1257]</a>
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel guidance for evaluation criteria.

## BP1256

### Statement

Use surrogate keys as the [primary key](#).

### Rationale

Instead of using the natural keys to uniquely identify each record, use a surrogate key. This allows the natural key information to be modified independently of the primary key and any foreign-key references to the key.

### Derived From

### Justifies

### Referenced By

[RDBMS Internals](#)

### Acquisition Phase

Development

### Evaluation Criteria

1. **Test** *Are surrogate keys used instead of natural keys?*

**Procedure** Look at the database metadata and determine if it uses surrogate or natural keys.

**Examples** The following example shows natural keys. The primary keys are made up completely or in part from naturally occurring data in the tables.

<i>Students:</i>			<i>Natural Keys</i>		
Name	Address	Phone			
John Public	200 Ash St, Hometown, USA	800-555-1234			
Jane Doe	170 Elm Ave, Hometown, USA	800-555-1212			


  

<i>Courses:</i>		
Name	Course #	Name
Jane Doe	B100	Intro Bio
Jane Doe	C100	Intro Chem
Jane Doe	P100	Intro Phys
Jane Doe	E100	English I
John Public	C100	Intro Chem
John Public	P100	Intro Phys

If the student name "Jane Doe" changes, all occurrences of the name must be changed.

The following example shows a surrogate key being used instead of a natural key. Maintaining data is less complex than it is with natural keys and consequently less error-prone.

<i>Students:</i>		<i>Surrogate Keys</i>	
Stu. ID	Name	Address	Phone
4321	John Public	200 Ash St, Hometown, USA	800-555-1234
1234	Jane Doe	170 Elm Ave, Hometown, USA	800-555-1212



<i>Courses:</i>		
Stu. ID	Course #	Name
1234	B100	Intro Bio
1234	C100	Intro Chem
1234	P100	Intro Phy
1234	E100	English I
4321	C100	Intro Chem
4321	P100	Intro Phy

If the student name “Jane Doe” changes, only one occurrence of the name must be changed.

## BP1257

<b>Statement</b>	Place a <a href="#">unique key constraint</a> on the <a href="#">natural key</a> fields.		
<b>Rationale</b>	Surrogate keys make it easier to maintain data. However, a column or set of columns should still uniquely identify the row in the table. This column or set of columns is the “natural key” or “secondary key.” This natural key should still be protected by the uniqueness constraint normally associated with a <a href="#">primary key</a> .		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	<b>1.</b>	<b>Test</b>	<i>Is there a unique key index for all tables that includes a column or set of columns not including the primary key?</i>
		<b>Procedure</b>	Look at the database metadata to ensure that each table has a unique key, and that the columns in the unique key are not also part of the primary key.

## BP1258

<b>Statement</b>	All data transferred via <a href="#">XML</a> should explicitly define the encoding style.
<b>Rationale</b>	By default, <a href="#">XML</a> is encoded using <a href="#">Unicode</a> . Consequently, data transferred via <a href="#">XML</a> should explicitly specify the encoding style. Assuming the default can cause <a href="#">interoperability</a> problems between implementations. For example, the <a href="#">ASCII</a> coding style is: {insert}
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Parsing XML Strategies, RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	<ol style="list-style-type: none"> <li><b>Test</b></li> </ol> <p><b>Procedure</b></p> <p><b>Examples</b> Look for the following <a href="#">XML</a> tag as the first line returned from queries that return <a href="#">XML</a> from the database.</p> <pre>&lt;?xml version="1.0" encoding="UTF-8"?&gt;</pre>

## BP1259

<b>Statement</b>	Use indexes.
<b>Rationale</b>	<p>An index in an <a href="#">RDBMS</a> is a summary of information organized to minimize the search time. Indexes summarize the information in a table. So, an employee table might have an index of last names, or last name and first name.</p> <p>Having additional indexes on tables involves a tradeoff between query performance and insert/update/delete performance, which requires underlying index maintenance.</p>
<b>Derived From</b>	
<b>Justifies</b>	<a href="#">[BP1260]</a> , <a href="#">[BP1261]</a> , <a href="#">[BP1262]</a>
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	See sublevel guidance for evaluation criteria.



## BP1260

<b>Statement</b>	All tables should have a <a href="#">primary key</a> defined. This is generally enforced via an underlying index.		
<b>Rationale</b>	By definition, a primary key uniquely defines each row within a table. To optimize the use of the table and to find records by the primary key, there should be an index that enforces the uniqueness of the key.		
<b>Derived From</b>	<a href="#">[BP1259]</a>		
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria</b>	1.	<b>Test</b>	<i>Is there a primary key defined for each table listed in the database?</i>
		<b>Procedure</b>	Examine the database metadata to ensure there is a primary key for each table in the database.
		<b>Example</b>	

## BP1261

<b>Statement</b>	Monitor and tune indexes according to the response time during normal operations in the production environment.
<b>Rationale</b>	<p>Index efficiency depends on the data being indexed. Common variables include:</p> <ul style="list-style-type: none"><li>• A sparsely populated table versus a densely populated table</li><li>• Data added in an presorted order versus a random order</li></ul> <p>Consequently, as the data changes, the efficiency of the index changes.</p>
<b>Derived From</b>	<a href="#">[BP1259]</a>
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	There are no tests to determine if the database has been monitored and tuned accordingly.

## BP1262

<b>Statement</b>	In the case of Oracle, define indexes against the <a href="#">foreign keys (FK)</a> columns to avoid contention and locking issues.
<b>Rationale</b>	
<b>Derived From</b>	<a href="#">[BP1259]</a>
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1263

<b>Statement</b>	Gather storage requirements in the planning phase, and then allocate twice the estimated storage space.
<b>Rationale</b>	Storage space on the disk always poses a problem for databases, so it is necessary to plan storage space carefully.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	None

## BP1264

<b>Statement</b>	For <a href="#">high availability</a> , use hardware solutions when geographic proximity permits.
<b>Rationale</b>	There are many ways to achieve high availability. Some are based on hardware and others on software. As a general rule, hardware solutions use simple redundancy and are consequently less complex and fragile. If geographic proximity is not an issue, the hardware solution is preferable.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">RDBMS Internals</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria</b>	There are no tests for this best practice.

## BP1265

**Statement**

[XML](#) validation is the responsibility of the [XML](#) document generator.

**Rationale**

All [XML](#) passed between two systems or services must be valid. The [XML](#) document generator is responsible for ensuring that the document is valid and [well-formed](#). If there are problems, the document generator is the only user that can effectively change the document.

[XML](#) Validity is checked via the use of a [W3C](#) Standard Validating parser. These parsers are built into most [XML](#) editors including XMLSpy but are also available as stand alone products. Either the [XML](#) is valid or diagnostics are returned indicating where the [XML](#) is invalid.

**Derived From**
**Justifies**
**Referenced By**

[Parsing XML Strategies](#)

**Acquisition Phase**

Development

**Evaluation Criteria**

1.      **Test**                      *Are all the [XML](#) documents exported from the system or service valid and [well-formed](#)?*
- Procedure**                Capture all the documents and validate them, using a product similar to XMLSpy®.
- Examples**                  None

## BP1272

**Statement:** If the availability of a control is dependent on the state of another control, the child control is indented below the parent and is unavailable(grayed out) for input until the parent control is selected.

**Rationale:** Makes it easier for the user to understand that the child controls depend on the selection of the parent.

**Derived From**

**Justifies**

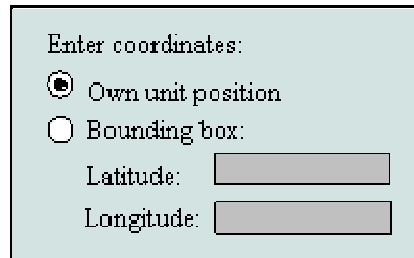
**Referenced By** [Look Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1.Test: *n/a*

**Procedure:**n/a

**Examples**



Enter coordinates:

☒ Own unit position

☐ Bounding box:

Latitude:

Longitude:

## BP1273

**Statement:** Push button labels should be grayed out if a button is unavailable.

**Rationale:** Makes it easier for the user to understand that the button cannot be used until other action is taken.

**Derived From**

**Justifies**

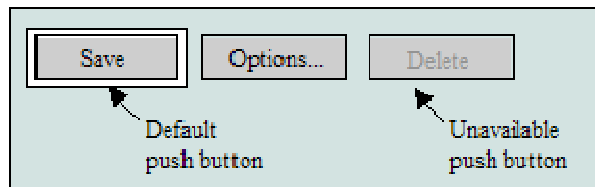
**Referenced By** [Look Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *n/a*

**Procedure:** *n/a*

**Examples:**





## BP1274

**Statement:** A check box or radio button group should be arranged in one or more rows or columns and left-aligned with the label on the right, not the left.

**Rationale:** Readability is increased.

**Derived From**

**Justifies**

**Referenced By** [Look Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *n/a*

**Procedure:** *n/a*

**Examples:**

Heading		
<input type="checkbox"/>	Label	
<input type="checkbox"/>	Label	
<input type="checkbox"/>	Label	

Heading		
<input type="radio"/>	Label	
<input type="radio"/>	Label	
<input type="radio"/>	Label	

## BP1289

<b>Statement:</b>	When a form is initially displayed, focus should be assigned to the top leftmost control or the control with which users are expected to interact first. Tab order is from upper left to lower right on the form, based on the order in which users are expected to interact with the controls.
<b>Rationale:</b>	This interface navigation convention, left to right and top to bottom, allows users to understand the order of data entry and complete tasks in a logical sequence.
<b>Derived From</b>	
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Feel Aspects</a>
<b>Acquisition Phase</b>	Development
<b>Evaluation Criteria:</b>	<p>1. <b>Test:</b> n/a</p> <p><b>Procedure:</b> n/a</p> <p><b>Examples:</b></p>

**Portlet Name**

**Heading**  
 Label:

**Heading**  
 Label:   
 Label:  ▼

## BP1290

**Statement:** Use a tool tip to display help information about a control when the purpose of the control is not self-evident. A mouse over event is the typical mapping for invoking a tool tip.

**Rationale:** Increases user efficiency by preventing click errors.

**Derived From**

**Justifies**

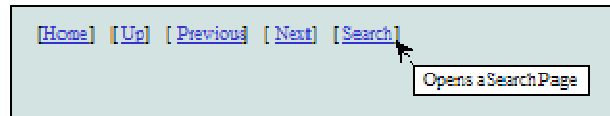
**Referenced By** [Feel Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *n/a*

**Procedure:** *n/a*

**Examples:**



# BP1291

**Statement:** Search results that span multiple pages should contain obvious navigation controls for moving between pages. For example, “<” and “>” can navigate back and forward one page, and “<<” and “>>” can navigate back to the beginning page and forward to the end page.

**Rationale:** User can quickly identify and use paging controls.

**Derived From**

**Justifies**

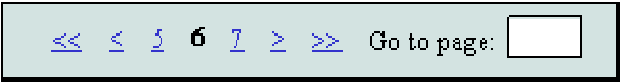
**Referenced By** [Feel Aspects](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1.Test: n/a

**Procedure:**n/a

**Examples:**



# BP1297

**Statement:** A website hierarchy should be structured so users can reach important information and/or frequently accessed functions in a maximum of three jumps. Use a shallow structure rather than a deep structure.

**Rationale:** A users success at finding a target drops off sharply after three clicks.

**Derived From**

**Justifies**

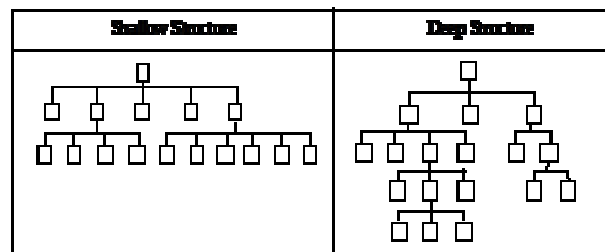
**Referenced By** [User Experience](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** *n/a*

**Procedure:** *n/a*

**Examples:**



## BP1298

**Statement:** Provide basic search functionality as the default with a link or button that provides more advanced search features.

**Rationale:** Makes the search feature cleaner and easier to use because the advanced features are hidden.

**Derived From**

**Justifies**

**Referenced By** [User Experience](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. Test: *n/a*

**Procedure:** n/a

**Examples:**

Search	
Keyword:	<input type="text" value="Map Iraq"/>
	<input type="button" value="Go"/>
<a href="#">Advanced Search</a>	

Advanced Search	
Search by keyword	
Keyword:	<input type="text"/>
	<input type="button" value="Go"/>
Search by category	
Look for documents in category	<input type="text" value="All"/> <input type="button" value="▼"/>
	<input type="button" value="Go"/>

## BP1299

**Statement:** All web pages should contain a link back to the homepage. This can be in the form of a logo and a regular HTML link called “Home”.

**Rationale:** Helps user navigate the web site.

**Derived From**

**Justifies**

**Referenced By** [User Experience](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:** n/a

**Procedure:** n/a

**Examples:**



## BP1355

<b>Statement:</b>	<b>Do not design the database around the requirements of an application.</b>		
<b>Rationale:</b>	Databases often outlive applications (ie legacy databases and evolution of applications). Database can also support multiple applications. If design of the database was design around the application, it may present security holes that can be exploited by other applications. It is better to design the application around the rules set by the database.		
<b>Derived From</b>			
<b>Justifies</b>			
<b>Referenced By</b>	<a href="#">Relational Database Management Systems (Security)</a>		
<b>Acquisition Phase</b>	Development		
<b>Evaluation Criteria:</b>	<b>1.</b>	<b>Test:</b>	<i>Check to make sure application business logic or rules is not found in the database.</i>
		<b>Procedure:</b>	Make sure data validation is done at database even if it is already being done at the application level.
		<b>Examples:</b>	



## BP1394

**Statement:** Data objects to be exposed to the enterprise will be identified, published and validated early in the data engineering process and updated in a spiral fashion as system development proceeds.

**Rationale:**

**Derived From**

**Justifies**

**Referenced By**

**Acquisition  
Phase**

**Evaluation  
Criteria:**

1.

**Test:**

**Procedure:**

**Examples:**

BP1395

**Statement:** For Systems of Record (SOR's), priority will be placed on external interfaces as they migrate to [XML](#)

**Rationale:**

**Derived From**

**Justifies**

**Referenced By**

**Acquisition  
Phase**

**Evaluation  
Criteria:** 1.

**Test:**

**Procedure:**

**Examples:**

## BP1396

**Statement:** For new systems, data engineering analysis will be initiated prior to Milestone A.

**Rationale:**

**Derived From**

**Justifies**

**Referenced By**

**Acquisition  
Phase**

**Evaluation  
Criteria:**

1.

**Test:**

**Procedure:**

**Examples:**

BP1397

**Statement:** For new systems, use cases will be identified and developed or reuse made of existing use cases as appropriate as early in the data engineering process as possible to inform [data model](#) development.

**Rationale:**

**Derived From**

**Justifies**

**Referenced By**

**Acquisition  
Phase**

**Evaluation  
Criteria:** 1.

**Test:**

**Procedure:**

**Examples:**

## BP1398

**Statement:** Develop Interaction models as appropriate.

**Rationale:**

**Derived From**

**Justifies**

**Referenced By**

**Acquisition  
Phase**

**Evaluation  
Criteria:** 1.

**Test:**

**Procedure:**

**Examples:**

BP1399

**Statement:** Developers will design for runtime updates of enhanced [schemas](#).

**Rationale:**

**Derived From**

**Justifies**

**Referenced By** [Family of Interoperable Operational Pictures \(FIOP\)](#)

**Acquisition  
Phase**

- Evaluation  
Criteria:**
1.

**Test:**  
  
**Procedure:**  
  
**Examples:**

## BP1400

**Statement:** Programs will use authoritative [metadata](#) established by the Joint Mission Threads (JMT)s when available

**Rationale:**

**Derived From**

**Justifies**

**Referenced By**

**Acquisition  
Phase**

**Evaluation  
Criteria:** 1. **Test:**

**Procedure:**

**Examples:**

BP1401

Statement:	A “metastory” for each data element will provide traceability between models and will include relationships to standard <a href="#">data elements</a> and architecture data definitions where appropriate		
Rationale:	questionable		
Derived From			
Justifies			
Referenced By			
Acquisition Phase			
Evaluation Criteria:	1.	Test:	
		Procedure:	
		Examples:	



## BP1402

**Statement:** Business rules will not be encoded in the [XML](#) exchange formats.

**Rationale:** questionable

**Derived From**

**Justifies**

**Referenced By** [Family of Interoperable Operational Pictures \(FIOP\)](#)

**Acquisition  
Phase**

**Evaluation  
Criteria:** 1. **Test:**

**Procedure:**

**Examples:**

BP1403

**Statement:** [Data](#) will be segmented into “chunks” in accordance with security and export control levels, and encryption and access controls will be applied to the “chunks”.

**Rationale:**

**Derived From**

**Justifies**

**Referenced By** [Family of Interoperable Operational Pictures \(FIOP\)](#)

**Acquisition  
Phase**

- Evaluation  
Criteria:**
1.

**Test:**  
  
**Procedure:**  
  
**Examples:**

## BP1404

<b>Statement:</b>	All DoD Programs requiring a <a href="#">data model</a> should review the <a href="#">NATO</a> Generic Hub v.5 model ( <a href="#">LC2IEDM</a> ) as an example of a successful <a href="#">COI</a> developed model.
<b>Rationale:</b>	The <a href="#">Land C2 Information Exchange Data Model (LC2IEDM)</a> , or Generic Hub (GH, now version 5) model has been under development in the <a href="#">NATO</a> environment. This model is a rich Joint battlespace operational context model. Many <a href="#">NATO</a> countries have developed prototypes. The US Army has also been active in the Generic Hub efforts.
<b>Derived From</b>	<a href="#">[G1141]</a>
<b>Justifies</b>	
<b>Referenced By</b>	<a href="#">Metadata Registry</a>
<b>Acquisition Phase</b>	
<b>Evaluation Criteria:</b>	<ol style="list-style-type: none"> <li> <b>Test:</b>   <b>Procedure:</b>   <b>Examples:</b> </li> </ol>

## BP1408

**Statement:** Use a [semantic](#) description language such as [Ontology Web Language \(OWL\)](#) or [Resource Definition Framework \(RDF\)](#) to represent an [Ontology](#).

**Rationale:** Data producer recommendations are still maturing for how to handle data producers interaction with [Ontology Web Language \(OWL\)](#) or [Resource Definition Framework \(RDF\)](#).

**Derived From**

**Justifies**

**Referenced By** [Metadata \(Mediation\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:**

**Procedure:**

**Examples:** None

## BP1409

**Statement:** [Service providers](#) should register [web service](#) using [Web Services Description Language \(WSDL\)](#) and [Universal Description, Discovery, and Integration \(UDDI\)](#)

**Rationale:** [Semantic](#) Ontology languages such as [Ontology Web Language \(OWL\)](#) or [Resource Definition Framework \(RDF\)](#) are currently immature.

**Derived From**

**Justifies**

**Referenced By** [Metadata \(Mediation\)](#)

**Acquisition Phase** Development

**Evaluation Criteria:** 1. **Test:**

**Procedure:**

**Examples:** None



# Glossary

## Glossary

Glossary terms are included to help make Guidance details and Best Practices more definitive and succinct. Defining acronyms and terms within the other document components can cause conflicts between the document components and even within a single document component. An example of a conflict between the document components might be two different guidance statements that refer to a “service”. One uses a broad definition and another uses a specific very narrowly defined “web service” interpretation. This problem can occur if a perspective or rationale defines the guidance differently than the actual guidance statement.

There are three parts to a NESI Glossary entry:

<b>Term</b>	A word or expression that is used within the NESI documentation that needs to have a formal definition. It may be the expression that is associated with an acronym that is used within the NESI documentation. Example: Net-Centric Enterprise Solutions for Interoperability.
<b>Acronym</b>	A word that is formed from the initial letters or syllables of words and or expressions. Example: NESI. Note, this field is optional because not all terms have acronyms.
<b>Definition</b>	A definition that describes what the glossary term means within the NESI context. The definition may be provided by another source, but it is copied into the NESI glossary to prevent the external definition from changing without being vetted through NESI Working Group. If the term has been copied from another source, a reference to the source is provided.



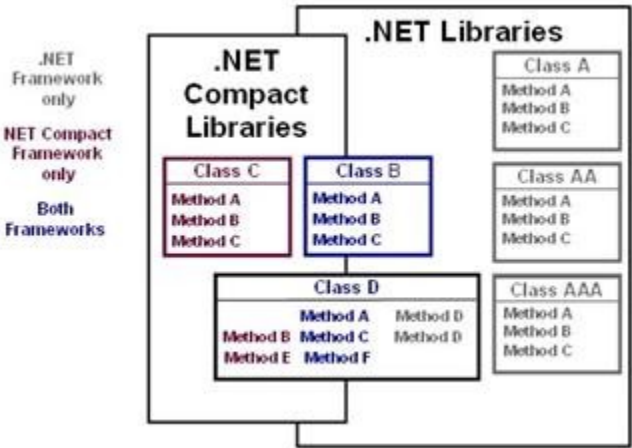
Term	Acronym	Definition
<b>.NET</b>		To address the confusing maze of computer languages, libraries, tools, and toolkits that were necessary for creating multi-tier applications, Microsoft developed the .NET Framework and integrated it into Microsoft Windows as a component. It supports building and running multi-tier and service-oriented architectures, including web services and client and server applications. It simplifies the process of designing, developing, and testing software, allowing individual developers to focus on core, application-specific code.
<b>.NET Compact Framework</b>		<p>The Microsoft <a href="#">.NET</a> Compact Framework is a streamlined version of the <a href="#">.NET</a> Framework that is designed to run on mobile devices with limited memory, resources, and battery power, including smart devices like <a href="#">Personal Digital Assistants (PDAs)</a>, mobile phones, and set-top boxes. The <a href="#">.NET</a> Compact Framework includes the base class libraries from the full <a href="#">.NET</a> Framework and a few libraries designed specifically for mobile devices such as Windows CE InputPanel.</p> <p>Developers can create applications for the <a href="#">.NET</a> Compact Framework in Visual Studio <a href="#">.NET</a> 2003, using Microsoft Visual C# <a href="#">.NET</a> or Microsoft Visual Basic <a href="#">.NET</a>. The resulting applications are designed to run on a special, mobile-device, high performance <a href="#">JIT</a> compiler.</p> <p>To run <a href="#">.NET</a> Compact Framework applications, the platform must support the Microsoft <a href="#">.NET</a> Compact Framework runtime. This includes Windows CE <a href="#">.NET</a>, Windows CE 4.1, Microsoft Pocket PC, Microsoft Pocket PC 2002, or Smartphone 2003.</p>

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### *Architecture*

The [.NET](#) Compact Framework is a subset of the [.NET](#) Libraries. It includes only those aspects of the [.NET](#) Library that are essential for the functionality. Several namespaces and classes are used exclusively in the [.NET](#) Library. Other namespaces, classes and methods are in both the [.NET](#) Library and the .Net Compact Library, and there are namespaces and classes that are exclusive to the .Net Compact Library.





# A

## A

<b>Absolute Font Size</b>		Font that always displays at a certain pre-determined size.
<b>Abstract Window Toolkit</b>	<b>AWT</b>	The AWT is part of the Java Foundation Classes ( <a href="#">JFC</a> ) – the standard API for providing graphical user interfaces ( <a href="#">GUIs</a> ) for Java programs.
<b>Access Control</b>		The methods by which interactions with resources are limited to collections of users or programs for the purpose of enforcing integrity, confidentiality, or availability constraints. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Accredited Standards Committee X12</b>	<b>ANSI ASC X12</b>	Numbered set of commercial <a href="#">EDI</a> transactions defined by the American National Standards Institute's Accredited Standards Committee X12. Uniform rules for the interchange of business documents defined for cross industry EDI use.
<b>Acquisition Category</b>	<b>ACAT</b>	DoD acquisition program categories that facilitate decentralized decision making, execution, and compliance with statutorily imposed requirements. The categories determine the level of review, decision authority, and applicable procedures. (Source: <a href="http://www.dau.mil/pubs/glossary/11&lt;sup&gt;th&lt;/sup&gt; Glossary 2003.pdf">http://www.dau.mil/pubs/glossary/11<sup>th</sup> Glossary 2003.pdf</a> )
<b>Acquisition Program Baseline</b>	<b>APB</b>	Establishes program threshold and objective values for the minimum number of cost, schedule, and performance attributes that describe the program over its life cycle. (Source: <a href="http://www.dtic.mil/cjcs_directives/cdata/unlimit/3170_01.pdf">http://www.dtic.mil/cjcs_directives/cdata/unlimit/3170_01.pdf</a> )
<b>Acquisition Strategy</b>	<b>AS</b>	High-level business and technical management approach designed to achieve program objectives within specified resource constraints. Framework for planning, organizing, staffing, controlling, and leading a program. (Source: <a href="http://www.dau.mil/pubs/glossary/11&lt;sup&gt;th&lt;/sup&gt; Glossary 2003.pdf">http://www.dau.mil/pubs/glossary/11<sup>th</sup> Glossary 2003.pdf</a> )
<b>Active Server Page.</b>	<b>ASP</b>	A script that is executed by Microsoft Internet Information Services. The output is returned to the user as <a href="#">HTML</a> . Typically, an ASP script generates a customized web page on the fly before sending it to the user. ASPs are specific to Microsoft, only run on <a href="#">IIS</a> or <a href="#">PWS</a> , can contain HTML, <a href="#">JScript</a> , and <a href="#">VBScript</a> and can access <a href="#">COM</a> components.
<b>ActiveX</b>		An ActiveX control is similar to a Java <a href="#">applet</a> . However, ActiveX controls have full access to the Windows OS. This gives them much more power than Java <a href="#">applets</a> , plus a risk that the <a href="#">applet</a> may damage software or data on your machine. To control this risk, Microsoft developed a registration system so that browsers can identify and authenticate an ActiveX control before downloading it. Another difference between Java applets and ActiveX controls is that Java <a href="#">applets</a> can be written to run on all platforms, whereas ActiveX controls are currently limited to Windows environments.
<b>Adaptation</b>		When a client cannot communicate directly with a service, an adapter is employed. Adapters provide service mediation when services need to communicate point-to-point. Can be transport protocol as well as data format.

**Adapter**

**Note:** See [Mediation](#).

**Adapter**

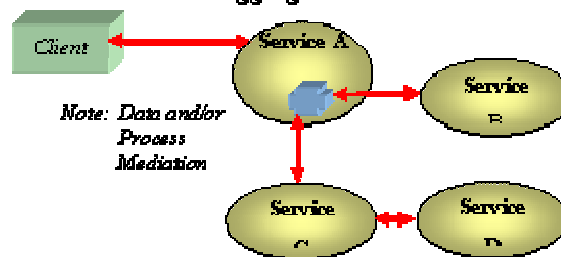
An intermediary that translates between incompatible components interfaces, allowing them to communicate.

**Adapter Pattern**

A generalized API that provides a common set of function calls across different applications. It enables classes with incompatible interfaces to work together. It is sometimes called a wrapper because an adapter class wraps the implementation of another class in the desired interface. This pattern makes heavy use of delegation, where the delegator is the adapter (or wrapper) and the delegate is the class being adapted.

**Aggregation**

When information is derived from multiple sources a mediator service may aggregate the data and thus make many services appear to be one.

**Aggregation**

**Note:** See [Mediation](#).

**Air Warfare**

Air defense against airborne weapons including theater ballistic missiles. Operations include surveillance, offensive counter air, defensive counter air, and electronic warfare.

**American Geological Institute**

**AGI**

**American National Standards Institute**

**ANSI**

Administrator and coordinator of the United States private-sector voluntary standardization system. ANSI facilitates the development of American National Standards (ANS) by accrediting the procedures of standards-developing organizations. The Institute remains a private, nonprofit membership organization supported by a diverse constituency of private and public sector organizations. (Source: <http://web.ansi.org/>)

**American Standard Code for Information Interchange**

**ASCII**

ASCII is a character set and a character encoding based on the Roman alphabet as used in modern English (see English alphabet). ASCII codes represent text in computers, in other communications equipment, and in control devices that work with text. Most often, nowadays, character encoding has an ASCII-like base.

ASCII defines the following printable characters, presented here in numerical order of their ASCII value

```

! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^ _
  
```

~abcdefghijklmnopqrstuvwxyz{|}~

<http://en.wikipedia.org/wiki/ASCII>

<b>Analysis of Alternatives</b>	<b>AoA</b>	Provides analysis and suggestions for performance characteristics. Assesses the advantages and disadvantages of alternatives, including the sensitivity of each alternative to possible changes in key assumptions or variables. (Source: <a href="http://www.dau.mil/pubs/glossary/11&lt;sup&gt;th&lt;/sup&gt; Glossary 2003.pdf">http://www.dau.mil/pubs/glossary/11<sup>th</sup> Glossary 2003.pdf</a> )
<b>Anonymous Access</b>		Accessing a resource without authentication. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>ANSI X12</b>		Numbered set of commercial <a href="#">EDI</a> transactions defined by the American National Standards Institute's Accredited Standards Committee X12. Uniform rules for the interchange of business documents defined for cross industry EDI use.
<b>Apache Ant</b>		A Java-based build tool that automates the build process using XML descriptor files to capture the build process.
<b>API Adapter</b>		A generalized API that provides a common set of function calls across different applications.
<b>Applet</b>		A J2EE component that typically executes in a web browser. Applets can also execute in a variety of other applications or devices that support the applet programming model. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Application Diversity</b>		A situation where users can pull multiple apps to access the same data or choose the same app (e.g., for collaboration).
<b>Application Programming Interface</b>	<b>API</b>	A special type of interface that specifies the calling conventions with which one component may access the resources and services provided by another component. APIs are defined by sets of procedures or function-invocation specifications. An API is a special case of an interface.
<b>Application Server</b>		A platform for developing and deploying multi-tier distributed enterprise applications.
<b>Architecture</b>		(1) The structure of components, their relationships, and the principles and guidelines governing their design and evolution over time. (2) A high-level design that provides decisions about the problem(s) that the product will solve, component descriptions, relationships between components, and dynamic operation description. (3) A framework or structure that portrays relationships among all the elements of the subject force, system, or activity. Also, the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution. The organizational structure of a system or component, their relationships, and the principles and guidelines governing their design and evolution over time. (Source: IEEE 610.12)
<b>Architecture Tradeoff Analysis Method</b>	<b>ATAM</b>	The SEI defines ATAM as a risk mitigation method that can occur early in the software development life cycle when it is relatively inexpensive to change architectural decisions. (Source: <a href="http://www.sei.cmu.edu/ata/ata_init2.html">http://www.sei.cmu.edu/ata/ata_init2.html</a> )
<b>Architecture Views, Software</b>		Conceptual Architecture. The purpose of the conceptual architecture is to direct attention at an appropriate decomposition of the system without delving into details. Moreover, it provides a useful vehicle for communicating the architecture to non-technical audiences, such as management, marketing, and users. It consists of the Architecture Diagram (without interfaces) and an informal component specification (which we call CRC-R cards) for each component.

<b>Architecture, Functional</b>		The hierarchical arrangement of functions, their internal and external (to the aggregate itself) functional interfaces and external physical interfaces, their respective functional and performance requirements, and design constraints.
<b>Architecture, Software</b>		(1) The software architecture of a program or computing system is the structure or structures of the system, which comprise (a) software components, (b) the externally visible properties of those components, and (c) the relationships among them. (2) The structure and relationships among the components of a computer program. The software architecture may also include the program's interface with its operations environment.
<b>Architecture, System</b>		(1) A logical, physical structure that specifies interfaces and services provided by the system component necessary to accomplish system functionality. (2) The structure and relationship among the components of a system. The system architecture may also include the system's interface with the operational environment.
<b>Asset</b>		Any sensor, weapon, aircraft, boat, unmanned air vehicle (UAV), etc., directly controlled by own ship.
<b>Assistant Secretary of Defense</b>	<b>ASD</b>	(Source: <a href="http://www.dod.mil/nii/">http://www.dod.mil/nii/</a> )
<b>Assistant Secretary of Defense for Networks and Information Integration</b>	<b>ASD (NII)</b>	(Source: <a href="http://www.dod.mil/nii/">http://www.dod.mil/nii/</a> )
<b>Associated Measurement Report</b>	<b>AMR</b>	A sensor measurement that has been processed by the originating sensor for clutter rejection and meets defined signal-to-noise parameters, and has been associated with either a local sensor track or a global composite track.
<b>Association</b>		(1) The automatic or manual establishment of a relationship between two or more tracks when the information on them is deemed to pertain to the same contact. (2) The process of identifying and linking data sets that may correspond to the same object while retaining each track as an individual entity.
<b>Assured Sharing</b>		Trusted accessibility to net resources such as data, services, apps, people, and collaborative environments.
<b>Asymmetric Key Cryptography</b>		Synonym for <a href="#">Public Key Cryptography</a>
<b>Atomicity, Consistency, Isolation, Durability</b>	<b>ACID</b>	The acronym for the four properties guaranteed by transactions. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Attribute</b>		A distinct characteristic of an object. Real-world object attributes are often specified in terms of their physical traits, such as size, shape, weight, and color. Cyberspace object attributes might describe size, type of encoding, and network address. (Source: <a href="http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf">http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf</a> )
<b>Attribute data</b>		Any non-kinematic data provided by a sensor for a track. Examples include IFF mode codes, INTEL data

(e.g., imagery), EW data (e.g., parametric data), non-cooperative target recognition (NCTR) data, etc.

**Authentication**

The process that verifies the identity of a user, device, or other entity in a computer system, usually as a prerequisite to allowing access to resources in a system. The Java servlet specification requires three types of authentication (basic, form-based, and mutual) and supports digest authentication. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Authority to Operate**

**ATO**

An ATO or IATO is required prior to conducting operational tests on a deployable system. An ATO or IATO is granted only after the bulk of certification and accreditation activities are concluded, and the Designated Approving Authority (DAA) is satisfied with the residual risk to the system. (Source: [http://akss.dau.mil/dag/Guidebook/IG\\_c9.9.2.2.asp](http://akss.dau.mil/dag/Guidebook/IG_c9.9.2.2.asp) )

**Authorization**

The process by which access to a method or resource is determined. Authorization depends on the determination of whether the principal associated with a request through authentication is in a given security role. A security role is a logical grouping of users defined by the person who assembles the application. A deployer maps security roles to security identities. Security identities may be principals or groups in the operational environment. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

# B

## B

<b>Baseline, Allocated</b>		The initially approved documentation describing a system's functional, performance, interoperability, and interface requirements that are allocated from those of the system or higher level subsystem; interface requirements with interfacing subsystems; design constraints; derived functional and performance requirements; and verification requirements and methods to demonstrate the achievement of those requirements and constraints.
<b>Baseline, Functional</b>		The initially approved documentation describing a system's or configuration item's functional performance, interoperability, and interface requirements. Also, the verification required to demonstrate the achievement of those specified requirements.
<b>Basic Object Adapter</b>	<b>BOA</b>	The Basic Object Adapter was the predecessor to the and is incomplete. See the <a href="#">Portable Object Adapter (POA)</a> .
<b>Battle Force</b>		A standing operational naval task force organization of carriers, surface combatants, and submarines assigned to numbered fleets. A battle force is subdivided into battle groups.
<b>Binary Coded Decimal</b>	<b>BCD</b>	. Binary-coded decimal (BCD) is, after character encodings, the most common way of encoding decimal digits in computing and in electronic systems. In BCD, a digit is usually represented by four (binary) bits, of which the leftmost (written conventionally) has value 8, and the remaining three have values 4, 2, and 1. Only the combinations of these bits that, when summed, have values in the range 0-9 are valid. Other combinations are sometimes used for sign or other indications. (Source: <a href="http://en.wikipedia.org/wiki/Binary_Coded_Decimal">http://en.wikipedia.org/wiki/Binary_Coded_Decimal</a> )
<b>Binary XML</b>		
<b>Black Box</b>		Provides a specified function or functions at a specified level of performance for an agreed-upon cost.
<b>Business Community Integration</b>	<b>BCI</b>	
<b>Business Logic</b>		The code that implements the functionality of an application. In the Enterprise JavaBeans architecture, this logic is implemented by the methods of an enterprise bean. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Business Method</b>		A method of an enterprise bean that implements the business logic or rules of an application. (Source:

<http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Business Process  
Execution Language      BPEL**

BPEL is emerging as the standard for assembling a set of discrete services into an end-to-end process flow, radically reducing the cost and complexity of process integration initiatives. (Source: <http://www.oracle.com/technology/products/ias/bpel/index.html> )

**Business Process  
Execution Language  
for Web Services      BPEL4WS**

**Business Process  
Management      BPM**

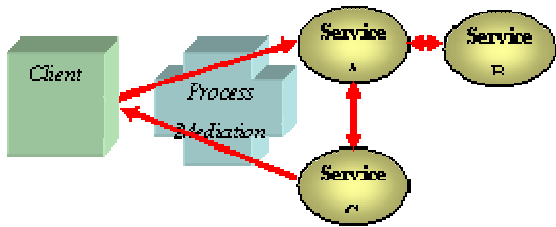
**Business-to-Business  
Integration      B2B**



## C

## C

<b>Canonicalization</b>		The process of converting an XML document to a form that is consistent to all parties. Used for documents and interpreting signatures
<b>Capabilities Development Document</b>	<b>CDD</b>	Provides operational performance attributes, including supportability, for the acquisition and design the proposed system. Includes key performance parameters (KPP) and other parameters for the development, demonstration, and testing of the current increment. Outlines the overall strategy for developing full capability. (Source: <a href="http://www.dau.mil/pubs/glossary/11thGlossary2003.pdf">http://www.dau.mil/pubs/glossary/11thGlossary 2003.pdf</a> )
<b>Capabilities Production Document</b>	<b>CPD</b>	Addresses the production attributes and quantities specific to a single increment of an acquisition program. Supersedes threshold and objective performance values of the CDD. (Source: <a href="http://www.dau.mil/pubs/glossary/11thGlossary2003.pdf">http://www.dau.mil/pubs/glossary/11thGlossary 2003.pdf</a> )
<b>Capabilities Requirements Document</b>		
<b>Capability Maturity Model</b>	<b>CMM</b>	
<b>Capability On Demand</b>		Delivery of and/or access to capabilities (data, applications, connectivity) incrementally and on demand, and controlled by user clearance.
<b>Capstone Requirements Document</b>	<b>CRD</b>	A document containing capabilities-based requirements that facilitates the development of Capability Development Documents (CDDs) by providing a common framework and operational guidance to guide their development. CRDs that have been approved by the Joint Requirements Oversight Committee (JROC) continue to be valid until absorbed into appropriate integrated architectures as required by CJCSM 3170.01C and retired. The JROC retains the authority to specifically direct the development of CRDs, as necessary. The CRD format is contained in CJCSM 3170.01.(CJCSI 3170.01C and 3170.01). (Source: <a href="http://www.dau.mil/pubs/glossary/11thGlossary2003.pdf">http://www.dau.mil/pubs/glossary/11thGlossary 2003.pdf</a> )
<b>Cascade Delete</b>		A deletion that triggers another deletion. A cascade delete can be specified for an entity bean in container-managed persistence. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Cascading Style Sheet</b>	<b>CSS</b>	A stylesheet used with HTML and XML documents to add a style to all elements marked with a particular tag, for the direction of browsers or other presentation mechanisms. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> ) -OR- Closed Source Software. Software in which the source code is not open and available, e.g., COTS (commercial off-the-shelf) software. COTS is distributed in a binary form. With COTS licenses, the purchaser is not allowed to take apart, reverse engineer the product, or modify the product for any purpose. Other forms of CSS include source code with royalty-free libraries (e.g., runtime libraries for compilers). CSS may come with source code licenses that associated licenses forbid the creation and distribution of any derived works. (Source: <a href="http://en.wikipedia.org/wiki/Closed_source">http://en.wikipedia.org/wiki/Closed_source</a> )
		A file that defines a hierarchical set of style rules that the creator of an HTML or XML file uses to control how that page is rendered in a browser or viewer, or how it is printed. A CSS includes a defined order of precedence to address cases when the definitions of any style element in a document conflict. . <a href="http://www.ibm.com/developerworks/websphere/glossary/index.cfm?topic=U007362">IBM WebSphere Glossary</a>

<b>Centre for Information Technology Innovation</b>	<b>CITI</b>	
<b>Certificate</b>	<b>CERT</b>	A certificate which uses a digital signature to bind together a public key with an identity in the form of the name of a person or an organization, their address, and so forth. The certificate can be used to verify that a public key belongs to an individual. <a href="http://en.wikipedia.org/wiki/Certificate_%28cryptography%29">http://en.wikipedia.org/wiki/Certificate_%28cryptography%29</a>
<b>Certificate Authority</b>	<b>CA</b>	Certification Authority (CA) is an trusted organization which issues digital public key certificates to be used by other parties. It is an example of a trusted third party. CA's are characteristic of many public key infrastructure (PKI) schemes. <a href="http://en.wikipedia.org/wiki/Certificate_authority">http://en.wikipedia.org/wiki/Certificate_authority</a>
<b>Certificate Revocation List</b>	<b>CRL</b>	A list of certificates (more accurately: their serial numbers) which have been revoked, are no longer valid, and should not be relied upon by any system user.  <a href="http://en.wikipedia.org/wiki/Certificate_Revocation_List">http://en.wikipedia.org/wiki/Certificate_Revocation_List</a>
<b>Chairman of the Joint Chiefs of Staff</b>	<b>CJCS</b>	
<b>Chairman of the Joint Chiefs of Staff Directives</b>		Instructions, Manuals, Notices, Guides, and other policy and procedures published by the Chairman of the Joint Chiefs of Staff. (Source: <a href="http://www.dtic.mil/cjcs_directives/index.htm">http://www.dtic.mil/cjcs_directives/index.htm</a> )
<b>Character Data</b>	<b>CDATA</b>	A predefined XML tag for character data that means "don't interpret these characters," as opposed to parsed character data (PCDATA), in which the normal rules of XML syntax apply. CDATA is typically used to show examples of XML syntax. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Check boxes</b>		A check selection box emulates checkboxes on a form where any number of attributes can be selected at the same time.
<b>Check constraint</b>		A constraint based on a user-defined condition - generally documented in a database domain. The condition evaluates to true for the contents of a data base column to be valid.
<b>Choreography</b>		When a client request spawns a chain of events or service requests that do not rely on a central coordinator, Choreography is employed. Choreographed Web Service knows when to execute and call other services to interact with. WS-CDL is an example of a business process management language that implements choreography.
<p style="text-align: center;"><b>Choreography</b></p> 		
	<b>Note:</b>	See <a href="#">Mediation</a> .
<b>Claim</b>		A claim is a declaration made by an entity (e.g. name, identity, key, group, privilege, capability, etc.).
<b>Class of Service</b>	<b>CoS</b>	A queuing discipline. The algorithm compares fields of packets or CoS tags to classify packets into different priority queues. CoS does not ensure network performance or certain priority in delivery.

		packets. See also Quality of Service(QoS). (Source: <a href="http://en.wikipedia.org/wiki/Class_of_service">http://en.wikipedia.org/wiki/Class_of_service</a> )
<b>Class-Based Design</b>		Any design that incorporates objects and classes. Contrast with object-oriented design and design.
<b>Class-Based Programming Language</b>		A programming language that enables programmers to define and use objects and classes, CLU. Contrast with object-based programming languages and object-oriented programming languages.
<b>Clickable Graphic</b>		An image or graphic that has been coded to contain interactive areas. When it is clicked on, it leads to another Web page or program. A clickable graphic usually contains just one link compared to a link map, which references many links. <a href="#">netlingo imagemap</a>
<b>Client</b>		A system entity that accesses a web service. (Source: <a href="http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf">http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf</a> )
<b>Client-Certificate Authentication</b>		An authentication mechanism that uses HTTP over SSL, in which the server and (optional) client authenticate each other with a public key certificate that conforms to a standard that is defined by the Public Key Infrastructure. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Common Business Oriented Language</b>	<b>COBOL</b>	COBOL is a third-generation programming language. Its name is an acronym, for <b>CO</b> mmon <b>B</b> usiness <b>O</b> riented <b>L</b> anguage, defining its primary domain in business, finance, and administrative systems for companies and governments.  The COBOL 2002 standard includes support for object-oriented programming and other modern language features. However, most of this article is based on COBOL 85. <a href="http://en.wikipedia.org/wiki/COBOL">http://en.wikipedia.org/wiki/COBOL</a>
<b>Cohesion</b>		The manner and degree to which the tasks performed by a single software module are related to each other. Types include coincidental, communicational, functional, logical, procedural, sequential, and temporal. Synonym: module strength. Contrast with coupling. In a well-designed, highly modular software design, the modules will have high cohesion; that is, each will have a clearly defined set of functions that have a close relationship to each other. This facilitates changes to modules since changes will affect only the closely-related functions. In contrast, modules that contain many unrelated functions blur the integrity of the software's design since the unrelated functions within a single module, thereby creating dependencies that inhibit the ability to easily make changes. (IEEE Std 610.12-1990 )
<b>COI service</b>		See Community of Interest Service.
<b>Collaboration</b>		Portal members can communicate synchronously through chat or messaging, or asynchronously through threaded discussion, blogs, and email digests (forums).
<b>Collaboration Protocol Agreement</b>	<b>CPA</b>	Rules of interaction between two parties dealing electronically, and a list of their IT capabilities.
<b>Collaboration Protocol Profile</b>	<b>CPP</b>	Profile of a company with a description of its capabilities.
<b>Combat Identification</b>	<b>CID</b>	CID is the process of attaining an accurate characterization of detected objects in the joint theater of operations to the extent that high confidence and timely application of military options and weapons resources can be applied to occur. Depending on the situation, this characterization may be limited to "friend," "enemy," or "neutral." In other situations, other characterizations may be required, including, but not limited to, civilian, national, nationality, and mission configuration.

<b>Command &amp; Control Warfare</b>	<b>C2W</b>	
<b>Command and Control</b>	<b>C2</b>	The exercise of authority and direction by a properly designated commander over assigned accomplishment of the mission. C2 functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures. A commander employs these when directing, coordinating, and controlling forces and operations in the accomplishment of the mission.
<b>Command and Control Enterprise Reference Architecture</b>	<b>C2ERA</b>	A technical concept of operations for building information systems better suited to the NCJ environment. C2ERA prescribed the technical architecture mandated by the Designated Authority Commander for C4ISR Enterprise Integration in the U.S. Air Force. C2ERA is one of two projects that merged to form NESI. The other project was RAPIDS.
<b>Command and Control Information Exchange Data Model</b>	<b>C2IEDM</b>	A data model that is managed by the Multilateral Interoperability Programme (MIP). It originated from experts from various NATO partners and from the Partnership-for-Peace nations. This data model is in the process of being submitted to OMG for consideration as the standard for information exchange. It falls under the shared operational picture exchange service. (Source: <a href="http://www.mip-site.org/MIP_DMWG.htm">http://www.mip-site.org/MIP_DMWG.htm</a> )
<b>Command Line Interface</b>	<b>CLI</b>	A method of interacting with a computer by giving it lines of textual commands (that is, a series of characters) either from keyboard input or from a script. (Source: <a href="http://en.wikipedia.org/wiki/Command_line_interface">http://en.wikipedia.org/wiki/Command_line_interface</a> )
<b>Command, Control, &amp; Communications</b>	<b>C3</b>	
<b>Command, Control, and Intelligence</b>	<b>C2I</b>	
<b>Command, Control, Communications, Computers, and Intelligence</b>	<b>C4I</b>	
<b>Command, Control, Communications, Computers, and Intelligence, Surveillance, and Reconnaissance</b>	<b>C4ISR</b>	
<b>Commercial Off-The-Shelf</b>	<b>COTS</b>	A term for systems that are manufactured commercially, and may be tailored for specific user requirements. (Source: <a href="http://en.wikipedia.org/wiki/Commercial_off-the-shelf">http://en.wikipedia.org/wiki/Commercial_off-the-shelf</a> )
<b>Commercial Software</b>		Commercial software is software developed by businesses which aim to make money from its sale. Commercial software is proprietary, but there is commercial free software, and there is non-commercial software. (Source: GNU.org: Categories of Free and Non-Free Software: <a href="http://www.gnu.org/philosophy/categories.html">http://www.gnu.org/philosophy/categories.html</a> )
<b>Commit</b>		The point in a transaction when all updates to any resources involved in the transaction are made permanent. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Common Gateway Interface script</b>	<b>CGI script</b>	CGI is a standard for interfacing external applications with information servers, such as HTTP servers. A plain HTML document that the web daemon retrieves is static, which means it is in a constant state: a text file that doesn't change. A CGI program, on the other hand, is executed by the web server.

so it can output dynamic information.

**Common Information Model**      **CIM**

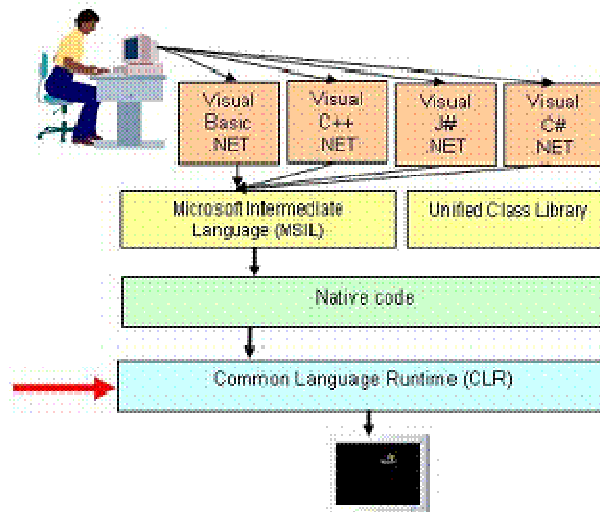
**Common Language Runtime**      **CLR**

At the very core of the .NET Framework is the [Common Language Runtime \(CLR\)](#). It encapsulates the services used from the operating system by compilers of higher level languages such as [.NET](#), Visual C++ [.NET](#), Visual J# [.NET](#) and Visual C# [.NET](#). The higher level languages are translated into native code that directly accesses the [CLR](#). See the [Microsoft Developer Network \(MSDN\)](#) article [Common Language Runtime Overview](#) for more details.

The following description of the [CLR](#) comes from [A Guide to Building Enterprise Applications with the .NET Framework](#), also available on [MSDN](#):

*The common language runtime (CLR) is a high-performance engine for running applications built using the .NET Framework. Code that targets the runtime and whose execution is managed by the runtime is referred to as managed code. Responsibility for tasks such as creating objects, making method calls, and so on is delegated to the CLR, which enables it to provide additional services to the code that it executes.*

*While the component is running, the CLR provides services such as memory management (including garbage collection), process management, thread management, and security enforcement and satisfies any dependencies that the component may have on other components.*



**Common Object Request Broker Architecture**

**CORBA**

CORBA "wraps" code written in another language into a bundle containing additional information about the capabilities of the code inside, and explaining how to call it. The resulting wrapped objects can be called from other programs (or CORBA objects) over the network. The CORBA specification defines APIs, communication protocol, and object/service information models to enable heterogeneous applications written in various languages running on various platforms to interoperate. (Source: <http://en.wikipedia.org/wiki/CORBA> )

**Communities of Interest**      **COI**

A collection of people who exchange information using a common vocabulary in support of common missions, business processes, and objectives. The community is made up of the users/operators who participate in the information exchange, the system builders who develop computer systems, and the system managers who maintain the systems.

		users, and the functional proponents who define requirements and acquire systems on behalf of the enterprise.
<b>Community of Interest Service</b>		A service that may be offered to the enterprise, but is owned and operated by a Community of Interest Service that provides or supports a well-defined set of mission functions and associated information.
<b>Compiler</b>		A computer program that translates programs expressed in a high-order language into their machine language equivalent. (Source: IEEE Std 610.12-1990)
<b>Complex Data</b>		Complex data can be represented in a complex data structure or can be mapped into a relational structure with additional metadata provided to represent the complex relationships.
<b>Complex Semi-Structured Data</b>		Complex Semi-Structured Data has partial metadata. It includes data defined in COBOL or Electronic Data Interchange standards ANSI X.12 and Health Level 7 (HL7). Semi-structured data can be as complex or more so as any Complex Structured data. It can map into or be XML. It may be missing some Metadata or an XSD.
<b>Complex Structured Data</b>		Complex Structured Data has well-defined metadata. It includes data represented in XML or other formats with deeply hierarchical and recursive structures. Complex data can be represented in a complex structure or can be mapped into a relational or flat structure with additional metadata provided to represent the complex relationships. Although Complex structured data is generically a product of oriented databases, the Complex Data Structures can be filled from any source.
<b>Complex Unstructured Data</b>		Complex Unstructured Data has little or no metadata. It includes data in binary files, spreadsheets, documents, and print streams.
<b>Component</b>		One of the parts that make up a system. A component may be hardware or software and may be subdivided into other components. Note the terms 'module,' 'component,' and 'unit' are often used interchangeably or defined to be sub-elements of one another in different ways depending on the context. The relationship of these terms is not yet standardized. (Source: IEEE Std 610.12-1990) "A component is not subject to decomposition from the perspective of a specific application."(Source: ISO 9000)
<b>Component and Service Management</b>	<b>CSM</b>	A set of management capabilities for monitoring and controlling deployed applications, their components, and web services. CSM collects data, analyzes it, and makes system management recommendations to operators. CSM also provides the ability to manage version configuration information and a scheduler to run batch jobs at a predetermined schedule. Other CSM capabilities include configuration management, end-to-end performance monitoring and analysis, service support, software distribution, service life-cycle management, and quality-of-service management.
<b>Component Object Model</b>	<b>COM</b>	A Microsoft software architecture for building component-based applications. COM objects are components, each with a unique identity, which expose interfaces that allow applications and other components to access their features. COM objects are more versatile than Win32 DLLs because they are completely language-independent, have built-in inter-process communications capability, and support an object-oriented program design. COM was first released in 1993 with OLE2, largely replacing the inter-process communication mechanism DDE used by the initial release of OLE. ActiveX is based on COM.
<b>System Component System</b>		A basic part of a system. System components may be personnel, hardware, software, facilities, equipment, material, services, and/or techniques that satisfy one or more requirements in the lowest level of functional architecture. System components may be subsystems and/or configuration items.
<b>Component-Based Software</b>	<b>CBA</b>	Mission applications that are architected as components integrated within a component framework.
<b>Composite/Collaborative</b>		A representation of an entity that is formed by combining individual instances of measurements or a collection of measurements from one or more sensors into a single composite/collaborative representation.

<b>Track</b>		vector and combined attribute information.
<b>Computer Network Defense</b>	<b>CND</b>	
<b>Concept of Operations</b>	<b>CONOPS</b>	
<b>Conceptual Model</b>		Captures the concepts of the relational database and can help enforce the first three normal
<b>Condition</b>		A variable of the operational environment or situation in which a unit, system, or individual to operate that may affect performance.
<b>Configuration Control Board</b>	<b>CCB</b>	Also Change Control Board. Duties include reviewing change requests, making decisions, communicating decisions made to affected groups and individuals. Represents the interests and project management by ensuring that a structured process is used to consider proposed incorporate them into a specified release of a product.
<b>Connection Pooling</b>		A technique for establishing a pool of resource connections that applications can share on a server.
<b>Connector</b>		A portable service API to external resources.
<b>Consumer</b>		A system entity invoking producers in a manner conforming to a specification. For example, aggregating content from portlets accessed using the WSRP protocol is a type of consumer. ( <a href="http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification">http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification</a> )
<b>Container</b>		A standard extension mechanism for containers that provides connectivity to enterprise information systems. A connector is specific to an enterprise information system. It consists of a resource application development tools for enterprise information system connectivity. The resource plugged in to a container through its support for system-level contracts defined in the Container architecture. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Content and Document Management</b>		Services that support the full lifecycle of document creation and provide mechanisms for approval, version control, scheduled publishing, indexing, and searching.
<b>Continuity of Operations Plan</b>	<b>COOP</b>	
<b>Contract Data Requirements List</b>	<b>CDRL</b>	A list of contract data requirements that are authorized for a specific acquisition and made contract. (Source: <a href="http://www.dau.mil/pubs/glossary/11th%20Glossary%202003.pdf">http://www.dau.mil/pubs/glossary/11th Glossary 2003.pdf</a> )
<b>Copyright</b>		The U.S. Copyright Act, 17 U.S.C. §§ 101 - 810 (17 U.S.C. §§ 101 - 810), is Federal legislation by Congress under its Constitutional grant of authority to protect the writings of authors. The Act covers architectural design, software, the graphic arts, motion pictures, and sound recordings. A copyright gives the owner the exclusive right to reproduce, distribute, perform, display, or otherwise use the work. The owner also receives the exclusive right to produce or license derivatives of his or her work (17 U.S.C. 201(d)). Limited exceptions to this exclusivity exist for types of "fair use," such as book reviews. To be covered by copyright a work must be original and in a concrete "medium of expression." Under current law, works are covered whether or not a copyright notice is attached and whether the work is registered.
<b>CORBA Component Model</b>	<b>CCM</b>	Part of the CORBA 3.0 Specification, CCM extends the CORBA object model and enforces composition rather than inheritance. Similar to a CORBA version of EJB that can be used with any language platform. (Source: <a href="http://www.omg.org/technology/documents/formal/components.htm">http://www.omg.org/technology/documents/formal/components.htm</a> )

<b>Core Enterprise Service</b>	<b>CES</b>	<p>A ubiquitous, common solution service that provides capabilities essential to the operation of the enterprise.</p> <p>Generic information services that apply to any COI, provide the basic ability to search the COI for the desired information, and then establish a connection to the desired service. (Source: <a href="http://www.defenselink.mil/nii/org/cio/doc/GIG_ES_Core_Enterprise_Services_Strategy">http://www.defenselink.mil/nii/org/cio/doc/GIG_ES_Core_Enterprise_Services_Strategy</a>)</p>
<b>Correlation</b>		<p>(1) The determination that a locally derived track represents the same object or point as another track and/or the process of combining two such tracks/data under one track number. (Logicon) (2) The process of identifying tracks believed to represent the same object and replacing them with a single track, combining the data from the duplicate tracks as appropriate.</p>
<b>Coupling</b>		<p>The manner and degree of interdependence between software modules. Types include component coupling, environment coupling, content coupling, control coupling, data coupling, hybrid coupling, interface coupling, pathological coupling. Contrast with cohesion. In a well-designed, highly modular software system, coupling between modules will be minimized. This facilitates changing and replacing modules with minimal effect on other modules within the system. (Source: IEEE Std 610.12-1990)</p>
<b>Credentials</b>		<p>The information describing the security attributes of a principal. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )</p>
<b>CRL Distribution Point</b>	<b>CDP</b>	<p>The location where the CA puts the CRL for relying parties to obtain the most current CRL.</p>
<b>Cross Compiler</b>		<p>"A compiler that executes on one computer but generates machine code for a different computer architecture. (Source: IEEE Std 610.12-1990)</p>
<b>Cross Domain Security</b>	<b>CDS</b>	<p>User authentication across multiple application spaces.</p>
<b>Customized Application</b>		<p>An application that can be tailored on a continuing basis to meet current Rules of Engagement and readjusted to meet tomorrow's needs.</p>
<b>Customized Delivery</b>		<p>Smart push-and-pull of data reduces overload and provides the requested data to operators in a timely manner. Tailored discovery, publish, and subscribe capabilities allow operators to register for specific services in specific timeframes.</p>



# D

## D

<b>Data</b>	Unprocessed information; information without context
<b>Data Analysis</b>	
<b>Data Architect</b>	<p>A Data Architect is a job title associated with a person within an organization responsible for making sure the organization's strategic goals are optimized through the use of enterprise data standards. This frequently involves creating and maintaining a centralized registry of <a href="#">metadata</a>.</p> <p>Data Architecture includes topics such as metadata management, business semantics, data modeling and metadata workflow management.</p> <p>Data Architect's job frequently includes the set up a <a href="#">Metadata registry</a> and allows domain-specific stakeholders to maintain their own <a href="#">data elements</a>.</p>
<b>Data Asset</b>	<p>From the DoD Net-Centric Data Strategy (dated May 9, 2003) Data Asset is defined as any entity that is composed of data. For example, a database is a data asset that contains data records; e.g., system or application output files, databases, documents, or web pages. The term data asset also refers to services that provide access to data. For example, a service that returns individual records from a database is considered a data asset since it deals mainly in the function of providing data. Similarly, a web site that returns data in response to specific queries (e.g., <a href="http://www.defenselink.mil">www.defenselink.mil</a>) is considered a data asset.</p>
<b>Data Categorization</b>	
<b>Data Dictionary</b>	<p>A data dictionary is set of metadata that contains definitions and representations of <a href="#">data elements</a>.</p> <p>Within the context of a DBMS, a data dictionary is a read-only set of tables and views. The data dictionary may be considered a database in its own right.</p>
<b>Data Element Gallery</b>	<p>The Data Element Gallery is an important component of the Metadata Registry and Clearinghouse. The Data Element Gallery provides its users with access to <a href="#">data elements</a> that are commonly used by the Department of Defense such as country codes and U.S. state codes. Users may search the registry, compare <a href="#">data elements</a>, and download an Access database containing the available elements. <a href="http://diides.ncr.disa.mil/dereg/user/index.cfm">http://diides.ncr.disa.mil/dereg/user/index.cfm</a></p>

<b>Data Element</b>		<p>data element is an atomic unit of data that has:</p> <ul style="list-style-type: none"> <li>• An identification such as a Data element name</li> <li>• A clear Data element definition</li> <li>• One or more Representation terms</li> <li>• Optional enumerated values</li> </ul>
<b>Data Encryption Standard</b>	<b>DES</b>	<p>The Data Encryption Standard (DES) is a cipher (a method for encrypting information) selected as an official Federal Information Processing Standard (FIPS) for the United States in 1976, and which has subsequently enjoyed widespread use internationally. The algorithm was initially controversial, with classified design elements, a relatively short key length, and suspicions about a National Security Agency (NSA) backdoor.</p> <p><a href="http://en.wikipedia.org/wiki/Data_Encryption_Standard">http://en.wikipedia.org/wiki/Data_Encryption_Standard</a></p>
<b>Data Exchange</b>		<p>Operators can move data between applications easily and without losing data or capabilities. Data may carry security labels allowing for its exchange with partners operating at coalition or multinational releasable security levels.</p>
<b>Data Exposure</b>		<p>The steps necessary to set up the metadata infrastructure associated with a net centric data strategy.</p>
<b>Data Fusion</b>		<p>A common command and control approach where the disparate sources of information available to a military or civilian commander or planner, are integrated (or fused) together.</p>
<b>Data Integrity</b>		<p>A measure of the consistency and accuracy of computer data. Integrity can be threatened by hardware problems, power outages, and disk crashes, but most often is threatened by application software or viruses. In a database program, data integrity can be threatened if two users are allowed to update the same item or record at the same time. Record or File Locking, whereby only a single user is allowed access to a given record at any one point in time is one method of ensuring data integrity.</p> <p><a href="http://www.courts.state.ny.us/ad4/lib/gloss.html#D">http://www.courts.state.ny.us/ad4/lib/gloss.html#D</a></p>
<b>Data Modeling</b>	<b>DM</b>	<p>Modeling is an essential step in understanding the data that will comprise a system. The end products of data modeling can be XML schemas or RDBMS schema definitions. Many COIs create their own data models, such as C2IEDM for the C2 community.</p>
<b>Data Publishing</b>		<p>The steps necessary to make data available within the net centric data strategy infrastructure.</p>
<b>Data Source Interface</b>	<b>DSI</b>	
<b>Database Data</b>		<p>Data stored in database columns in database tables in a relational database. The set of data records which which a relational database is populated. Generally understood to refer to application data and</p>

		not metadata.
<b>Database Management System</b>	<b>DBMS</b>	A system, usually automated and computerized, for managing any collection of compatible, and ideally normalized, data. (Source: <a href="http://en.wikipedia.org/wiki/DBMS">http://en.wikipedia.org/wiki/DBMS</a> )
<b>Data-Centric</b>		Data separated from applications; apps talk to each other by posting data.
<b>Data-Oriented Services</b>	<b>DOS</b>	A software component that receives a request and optionally returns an XML data response to a UFS or another DOS. A DOS has no visual or presentation component.
<b>Decorrelation</b>		The determination that locally held track data for a given track number does not represent the same object or point as track data being received in a remote track report for the same track number.
<b>Defense Collaboration Tool Suite</b>	<b>DCTS</b>	A flexible, integrated set of applications providing interoperable, synchronous, and asynchronous collaboration capability to the Department of Defense's (DoD) agencies, Combatant Commands, and military services. (Source: <a href="http://www.disa.mil/main/prodsol/dcts.html">http://www.disa.mil/main/prodsol/dcts.html</a> )
<b>Defense Data Dictionary System</b>	<b>DDDS</b>	
<b>Defense Federal Acquisition Regulation Supplement</b>	<b>DFARS</b>	
<b>Defense Information System Network</b>	<b>DISN</b>	
<b>Defense Information Systems Agency</b>	<b>DISA</b>	
<b>Defense Information Technology Security Certification and Accreditation Process</b>	<b>DITSCAP</b>	
<b>Defense Information Technology Standards &amp; Profiles Registry</b>	<b>DISR</b>	
<b>Department of</b>	<b>DoD</b>	A civilian Cabinet organization of the United States government. The Department of Defense controls the U.S. military and is

<b>Defense</b>	headquartered at The Pentagon. It is headed by the Secretary of Defense.  <a href="http://en.wikipedia.org/wiki/United_States_Department_of_Defense">http://en.wikipedia.org/wiki/United_States_Department_of_Defense</a>
<b>Department of Defense Instruction</b>	<b>DoDI</b>
<b>Department of Defense Intelligence Information System</b>	<b>DoDIIS</b>
<b>Department of the Navy</b>	<b>DON</b>
<b>Deployment</b>	The process whereby software is installed into an operational environment. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Deployment Descriptor</b>	An XML file provided with each module and J2EE application that describes how they should be deployed. The deployment descriptor directs a deployment tool to deploy a module or application with specific container options and describes specific configuration requirements that a deployer must resolve. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Deprecate</b>	Deprecation is the gradual phasing-out of features such as guidance, software or programming language features.  Guidance, features or methods marked as deprecated are considered obsolete, and further use is discouraged. The guidance features or methods are still valid although error messages as warnings may occur when they are referenced. These serve to alert the user to the fact that the feature may be removed in future releases.  Features get marked as deprecated, rather than simply removed, in order to provide backward compatibility end users.
<b>Description, Discovery, and Integration</b>	<b>DDI</b>
<b>Descriptive Label</b>	
<b>Deserialization</b>	Deserialization is the reverse process of <a href="#">serialization</a> . A stream of data is converted back into a complex object.  <b>Note:</b> The process of transferring data using <a href="#">serialization</a> and deserialization is called <a href="#">marshalling</a> .
<b>Design</b>	An arrangement of design elements that provides the design solution for a product or life cycle process intended to satisfy the

<b>Architecture</b>		functional architecture and the requirements baseline. (Source: IEEE 1220)
<b>Design Readiness Review</b>	<b>DRR</b>	
<b>Design Requirement</b>		A requirement that specifies or constrains the design of a system component. (Source:IEEE Std 610.12-1990)
<b>Dialog Box</b>		A dialog box is a window that 'pops up' to gather additional information or to allow you to change settings. You will usually need to press the OK button to continue, but variations include NEXT or FINISH also. <a href="http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html">http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html</a>
<b>Differentiated Services</b>	<b>DiffServ</b>	
<b>Digest</b>		A cryptographic checksum of an octet stream
<b>Digital Signature</b>		A value computed with a cryptographic algorithm and bound to data in such a way that intended recipients of the data can use the signature to verify that the data has not been altered and/or has originated from the signer of the message, providing message integrity and authentication. The signature can be computed and verified with symmetric key algorithms, where the same key is used for signing and verifying, or with asymmetric key algorithms, where different keys are used for signing and verifying (a private and public key pair are used)
<b>Digital Signature Algorithm</b>	<b>DSA</b>	The Digital Signature Algorithm (DSA) is a United States Federal Government standard for digital signatures. It was proposed by the National Institute of Standards and Technology (NIST) in August 1991 for use in their Digital Signature Standard (DSS), specified in FIPS 186, adopted in 1993. A minor revision was issued in 1996 as FIPS 186-1, and the standard was expanded further in 2000 as FIPS 186-2. <a href="http://en.wikipedia.org/wiki/Digital_Signature_Algorithm">http://en.wikipedia.org/wiki/Digital_Signature_Algorithm</a>
<b>Director of Central Intelligence Directive</b>	<b>DCID</b>	CIA publications that provide timely, coordinated, and clear guidance and direction to the Intelligence Community.
<b>Directory Service</b>		A directory service organizes computerized content and runs on a directory server computer. It is not to be confused with the directory itself, which is the database that holds the information about objects that are to be managed by the directory service. The directory service is the interface to the directory and provides access to the data that is contained in that directory. It acts as a central authority that can securely authenticate resources and manage identities and relationships between them. <a href="http://en.wikipedia.org/wiki/Directory_service">http://en.wikipedia.org/wiki/Directory_service</a>
<b>Disconnected</b>		An application that may not be available at all times. Not all applications within the enterprise will have a 24/7 connection to the

**Application**

other machines in the network. For example, consider a submarine that surfaces several times a day to obtain mission information. A message-base system can store the messages in a queue until the submarine surfaces. Disconnected applications allow the receiving application to process messages at any time. As a result, the sender and receiver are not as dependent on each other.

**Discovery  
Metadata****Discretionary  
Access Control****DAC**

Defines basic access control policies to objects in a file system. Generally, these are done at the discretion of the object owner: file/directory permissions and user/group ownership. (Source: [http://en.wikipedia.org/wiki/Discretionary\\_access\\_control](http://en.wikipedia.org/wiki/Discretionary_access_control))

**Distinguished  
Name****DN**

Distinguished names (DNs) are used to uniquely identify entries in an LDAP or X.500 directory. DN's are user-oriented strings and is typically composed of an ordered set of attribute type/attribute value pairs. Most DN's are composed of pairs in the following order:

```
* common name (cn)
* organization (o) or organizational unit (ou)
* country (c)
```

The following string-type attributes represent the set of standardized attribute types for accessing an LDAP directory. A DN can be composed of attributes with an LDAP syntax of Directory String, including the following:

```
* CN - CommonName
* L - LocalityName
* ST - StateOrProvinceName
* O - OrganizationName
* OU - OrganizationalUnitName
* C - CountryName
* STREET StreetAddress
```

[IBM InfoCenter](#)**Distributed  
Application**

An application made up of distinct components running in separate runtime environments, usually on different platforms connected via a network. Typical distributed applications are two-tier (client-server), three-tier (client-middleware-server), and multitier (client-multiple middleware-multiple servers). (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Distributed  
Component  
Object Model****DCOM**

Distributed Component Object Model (DCOM) is a Microsoft proprietary technology for software components distributed across several networked computers to communicate with each other. It extends Microsoft's COM, and provides the communication substrate under Microsoft's COM+ application server infrastructure. It has been deprecated in favor of Microsoft [.NET](#).

**Doctrine,  
Organization,  
Training,  
Materiel,  
Leadership,****DOTMLPF**

**Personnel,  
Facilities**
**Document Object Model**
**DOM**

An API for accessing and manipulating XML documents as tree structures. DOM provides platform-neutral, language-neutral interfaces that enable programs and scripts to dynamically access and modify content and structure in XML documents. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Document Type Definition**
**DTD**

Document Type Definition. An optional part of the XML document prolog, as specified by the XML standard. The DTD specifies constraints on the tags and tag sequences that can be in the document. The DTD has a number of shortcomings, however, and this has led to various schema proposals. For example, the DTD entry `<!ELEMENT username(#PCDATA)>` says that the XML element called "username" contains parsed character data; that is, text alone, with no other structural elements under it. The DTD includes both the local subset, defined in the current file, and the external subset, which consists of the definitions contained in external DTD files that are referenced in the local subset using a parameter entity. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**DoD Architecture Framework**
**DoDAF**
**DoD Discovery Metadata Specification**
**DDMS**

A NCES metadata initiative. DDMS defines discovery metadata [elements](#) for resources posted to community and organizational shared spaces. Sometimes (incorrectly) referred to as DoD Discovery Metadata Standard. (Source: <http://diides.ncr.disa.mil/mdreg/user/DDMS.cfm> )

**DoD Information Assurance Certification and Accreditation Program**
**DIACAP**
**DOD Net Centric Data Strategy**
**DoD PKI Class 3 Assurance Level**

Applications handling unclassified medium value information in Moderately Protected Environments, unclassified high value information in Highly Protected Environments, and discretionary access control of classified information in Highly Protected Environments. This assurance level is appropriate for applications that require identification of an entity as a legal person, rather than merely as a member of an organization.

**Note:** This definition is derived from the DoD Class 3 PKI Public Key-Enabled

**DoD PKI Class 4 Assurance Level**

Applications that handle high value unclassified information (mission critical) in minimally protected environments will require

Class 4 certificates.

**Note:** This definition is derived from the DoD Class 3 PKI Public Key-Enabled.

**DoD XML  
Gallery**

To ensure interoperability, this registry provides a baseline set of XML Information Resources developed through coordination and approval among the DoD communities. The Registry allows you to browse, search, and retrieve data that satisfy your requirements. The Registry has a substring search capability so that the user may easily find Information Resources that meet the criteria. The user may specify whether to search for the term within the name of the Information Resource, the definition, or both.  
<http://diides.ncr.disa.mil/xmlreg/user/information.cfm>

**Domain**

A group of related items within a certain area of interest.

**Domain Analysis**

The process of identifying the types of information that the data model uses. A good data model captures descriptive information about each of the types.

**Domain Name  
System      DNS**

The Domain Name System or DNS is a system that stores information about hostnames and domain names in a type of distributed database on networks, such as the Internet. Of the many types of information that can be stored, most importantly it provides a physical location (IP address) for each domain name, and lists the mail exchange servers accepting e-mail for each domain.

The DNS provides a vital service on the Internet as it allows the transmission of technical information in a user-friendly way. While computers and network hardware work with IP addresses to perform tasks such as addressing and routing, humans generally find it easier to work with hostnames and domain names (such as www.example.com) in URLs and e-mail addresses. The DNS therefore mediates between the needs and preferences of humans and of software.

**Drop Down List**

A drop down list selection box are similar to radio buttons but they but a list off possible choices is provided and only one can be chosen from the list. For example, the list of state abbreviations.

**Drop-Down Menu**

A menu of commands or options that appears when you select an item with a mouse. The item you select is generally at the top of the display screen, and the menu appears just below it, as if you had pulled it down.

**Dual Stacking**

Incorporating both IPv4 and IPv6 support in routers and computers.

**Dynamic HTML      DHTML**

Designates a technique of creating interactive web sites by using a combination of the static markup language HTML, a client-side scripting language such as JavaScript, and the style definition language Cascading Style Sheets. (Source:  
[http://en.wikipedia.org/wiki/Dynamic\\_web\\_page](http://en.wikipedia.org/wiki/Dynamic_web_page) )



**Dynamic  
Invocation  
Interface**                      **DII**

**Dynamic Web Page**                      See DHTML.

# E

## E

<b>ebXML</b>		A collection of standards sponsored by UNEFACT and <a href="#">OASIS</a> to exchange business messages, conduct trading relationships, and define and register business processes over the Internet.
<b>EDI Health Insurance Portability and Accountability Act</b>	<b>EDI HIPPA</b>	Mandates standards for <a href="#">EDI</a> transactions and code sets. Establishes uniform health care identifiers for providers, health plans, and employers.
<b>Electronic Business XML</b>	<b>EbXML</b>	A group of specifications designed to enable enterprises to conduct business through the exchange of XML-based messages. It is sponsored by <a href="#">OASIS</a> and the United Nations Centre for the Facilitation of Procedures and Practices in Administration, Commerce and Transport (U.N./CEFACT). (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Electronic Data Interchange</b>	<b>EDI</b>	Standard formats for exchanging business data and documents.
<b>Electronic Data Interchange for Administration, Commerce and Transport</b>	<b>EDIFACT</b>	
<b>Electronic Data Interchange Standards</b>		Standard formats for exchanging business data and documents.
<b>Electronic Data Internet Integration</b>	<b>EDIINT</b>	
<b>Electronic Systems Center</b>	<b>ESC</b>	
<b>Embedded Style Sheets</b>		Style sheets are placed in the heading of an <a href="#">HTML</a> document. They override linked style sheets.

```
<head>
  <style
    type="text/css">
      body{ text-align:center; }
      p{ font-family: Arial, sans-serif; font-
size:10pt; }
      h2{ font-family: Arial, serif; font-
size:16pt; }
    </style>
  </head>
```

<b>Encryption</b>	Encryption is the process of obscuring information to make it unreadable without special knowledge. While encryption has been used to protect communications for centuries, only organizations and individuals with an extraordinary need for secrecy have made use of it. In the mid-1970s, strong encryption emerged from the sole preserve of secretive government agencies into the public domain, and is now employed in protecting widely-used systems, such as Internet e-commerce, mobile telephone networks and bank automatic teller machines. <a href="http://en.wikipedia.org/wiki/Encryption">http://en.wikipedia.org/wiki/Encryption</a>
<b>End User</b>	A human user of information. This is distinct from those who develop or support the automated systems that provide the information. -OR- A person who uses a device-specific user agent to access a web site. (Source: <a href="http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf">http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf</a> )
<b>Endpoint</b>	The URL or location of the web service on the internet.
<b>End-To-End Message Level Security</b>	Established when a message that traverses multiple applications (one or more SOAP intermediaries) within and between business entities, e.g. companies, divisions and business units, is secure over its full route through and between those business entities. This includes not only messages that are initiated within the entity but also those messages that originate outside the entity, whether they are Web Services or the more traditional messages.
<b>Enterprise</b>	An organization considered as an entity or system that includes interdependent resources (e.g., people, organizations, and technology) that must coordinate functions and share information in support of a common mission or a set of related missions.
<b>Enterprise Application Archive    EAR</b>	A JAR archive that contains a J2EE application. It contains all the JAR, WAR, and RAR archives for an enterprise application, plus an XML descriptor. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Enterprise Application Integration    EAI</b>	Software to effect interface between enterprise software systems. Provides interface at the application layer.
<b>Enterprise Guidelines</b>	Rules that govern the choice/implementation of COI Enterprise Services.
<b>Enterprise Information Integration    EII</b>	
<b>Enterprise Information Portals    EIP</b>	An EIP is an intranet portal, usually under the control of a single domain such as the DoD. Some of the features of an EIP are single touch point, collaboration, content and document management, personalization, and integration. (Source:

[http://en.wikipedia.org/wiki/web\\_portal](http://en.wikipedia.org/wiki/web_portal) )

<b>Enterprise Java Bean</b>	<b>EJB</b>	A server-side component architecture for the development and deployment of object-oriented, distributed, enterprise-level applications. Applications written using the Enterprise JavaBeans architecture are scalable, transactional, and secure. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Enterprise Service</b>		A service that provides capabilities to the enterprise. See also Core Enterprise Service and Community of Interest Service.
<b>Enterprise Service Bus</b>	<b>ESB</b>	A layer of middleware through which a core set of reusable business services are made available
<b>Enterprise Service Management</b>	<b>ESM</b>	
<b>Enterprise Service Management NetOps Service</b>	<b>ESMNetOps</b>	
<b>Entity Bean</b>		An enterprise bean that represents persistent data maintained in a database. An entity bean can manage its own persistence or can delegate this function to its container. An entity bean is identified by a primary key. If the container in which an entity bean is hosted crashes, the entity bean, its primary key, and any remote references survive the crash. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Environment Variable</b>		Environment variables are a set of dynamic values that can affect the way running processes will behave. <a href="http://en.wikipedia.org/wiki/Environment_variable">http://en.wikipedia.org/wiki/Environment_variable</a>
<b>Ethernet</b>		A network communication system developed and standardized by DEC, Intel, and Xerox, using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model. It extends the physical layer and media with repeaters and implementations that operate on fiber, thin coax, and twisted-pair cable. (Source: <a href="http://www.sun.com/products-n-solutions/hardware/docs/html/817-6210-10/glossary.html">http://www.sun.com/products-n-solutions/hardware/docs/html/817-6210-10/glossary.html</a> )
<b>Event-Driven</b>		An application that responds to events.
<b>Event-Driven Application</b>		An application that responds to events. For example, a weather-reporting application may respond to weather sensor events. Since message-base systems are inherently asynchronous, synchronization is not an issue for application development. An application can simply put the message in the queue and not have to wait for a response. This decoupling allows applications to be more responsive and operate independently of time constraints.
<b>Execution Architecture</b>		An execution architecture is created for distributed or concurrent systems. The process view shows the mapping of

		components onto the processes of the physical system. The deployment view shows the mapping of (physical) components in the executing system onto the nodes of the physical system.
<b>Exposure</b>		visibility
<b>Extended User Community</b>	<b>EUC</b>	
<b>eXtensible Access Control Markup Language</b>	<b>XACML</b>	<p>XACML is used to represent and evaluate access control policies. XACML is designed to standardize the use of declarative policy to control access to resources.</p> <p>Used with SAML.</p>
<b>eXtensible Markup Language</b>	<b>XML</b>	<p>A markup language defines tags (markup) to identify the content, data, and text in XML documents. It differs from HTML, the markup language most often used to present information on the Internet. HTML has fixed tags that deal mainly with style or presentation. An XML document must undergo a transformation into a language with style tags under the control of a style sheet before it can be presented by a browser or other presentation mechanism. Two types of style sheets used with XML are CSS and XSL. Typically, XML is transformed into HTML for presentation. Although tags can be defined as needed in the generation of an XML document, you can use a document type definition (DTD) to define the elements allowed in a particular type of document. A document can be compared by using the rules in the DTD to determine its validity and to locate particular elements in the document. A web services application's J2EE deployment descriptors are expressed in XML with schemas defining allowed elements. Programs for processing XML documents use SAX or DOM APIs. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a>)</p>
<b>eXtensible Messaging Presence Protocol</b>	<b>XMPP</b>	
<b>Extensible Schema</b>		Descriptive messages constrained by an extensible schema delivered through the interfaces. An extensible schema allows new versions of services to be introduced without breaking existing services.
<b>eXtensible Style Language Transformations</b>	<b>XSLT</b>	<p>An XML document that controls the transformation of an XML document into another XML document or HTML. The target document often has presentation-related tags dictating how it will be rendered by a browser or other presentation mechanism. XSLT was formerly a part of XSL, which also included a tag language of style flow objects. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )</p>
<b>eXtensible Style Language Transformations</b>	<b>XSLTC</b>	<p>A compiling version of XSLT. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a>)</p>

## Complier

<b>eXtensible Stylesheet Language</b>	<b>XSL</b>	A standard that lets you do the following: (1) Specify an addressing mechanism, so that you can identify the parts of an XML document that a transformation applies to (XPath). (2) Specify tag conversions, so that you can convert XML data into different formats (XSLT). (3) Specify display characteristics, such as page sizes, margins, font heights and widths, and the flow objects on each page. Information fills in one area of a page and then automatically flows to the next object when that area fills up. That allows you to wrap text around pictures, or continue a newsletter article on a different page (XSL-FO). (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>eXtensible Stylesheet Language - Formatting Objects</b>	<b>XSL-FO</b>	XSL-FO is a language that specifies the physical layout, coloring, and typography of XML documents for screen, print, and other media. In this sense it is similar to CSS, but it is more powerful and flexible, particularly with regard to pagination and scrolling. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>eXtensible Tactical C4I Framework</b>	<b>XTCF</b>	
<b>External Certification Authority</b>	<b>ECA</b>	The DoD has established the External Certification Authority (ECA) program to support the issuance of DoD-approved certificates to industry partners and other external entities and organizations. The ECA program is designed to provide the mechanism for these entities to securely communicate with the DoD and authenticate to DoD Information Systems. <a href="http://iase.disa.mil/pki/eca/">http://iase.disa.mil/pki/eca/</a>
<b>External Style Sheet</b>		See linked style sheet.
<b>External Time Source</b>		Synchronizes internal clocks across BF platforms and represents the source of UTC time for the above system time.
<b>Extra Toolbar</b>		Toolbar not displayed by default. You can choose to display it from the View menu. <a href="http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html">http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html</a>
<b>Extract/Transform/Load</b>	<b>ETL</b>	Software to effect data transfer between enterprise software systems and data warehouse or datamarts.

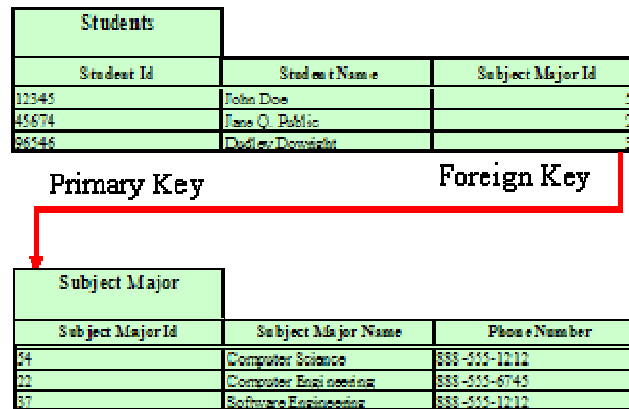
## F

## F

<b>Façade</b>		Provides a unified interface to a set of interfaces in a subsystem. Façade defines a higher-level interface to the subsystem easier to use. This can simplify a number of complicated object interactions into a single interaction.
<b>Federal Acquisition Regulation</b>	<b>FAR</b>	
<b>Federal Information Processing Standard</b>	<b>FIPS</b>	Under the Information Technology Management Reform Act (Public Law 104-106), the Secretary of Commerce develops standards and guidelines that are developed by the National Institute of Standards and Technology (NIST) for computer systems. These standards and guidelines are issued by NIST as Federal Information Processing Standards. These standards use government-wide. NIST develops FIPS when there are compelling Federal government requirements for interoperability and there are no acceptable industry standards or solutions. <a href="http://www.itl.nist.gov/fip">http://www.itl.nist.gov/fip</a>
<b>Federal Public Key Infrastructure</b>	<b>FPKI</b>	FPKI supports digital signatures and other public key-enabled security services. NIST is coordinating with technical groups developing PKI technology to foster interoperability of PKI products and projects. <a href="http://www.fpi.nist.gov/">http://www.fpi.nist.gov/</a>
<b>Federation</b>		A collection of trust domains that have established mutual pair-wise trust. The level of trust may vary, but authentication and may include authorization.
<b>Feel Aspect</b>		One of the traditional aspects of a graphical user interface. The "feel" covers the behavior of dynamic elements such as buttons, boxes, and menus
<b>File Extension</b>		Letters at the end of a filename separated by a period that indicate the type of information stored in the file. The file <b>myfile.doc</b> has a file extension of <b>doc</b> meaning it is a Microsoft® Word Document. <a href="http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html">http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html</a>
<b>File Transfer Protocol</b>	<b>FTP</b>	FTP transfers files to and from a remote network. The protocol includes the ftp command (local machine) and the ftpd daemon (remote machine). FTP enables a user to specify the name of the remote host and file transfer command from the local host's command line. The in.ftpd daemon on the remote host then handles the requests from the user. FTP works even when the remote computer does not run a UNIX-based operating system. A user must log in to the remote computer to make an ftp connection unless it has been set up to allow anonymous FTP. (Source: <a href="http://www.sun.com/products-n-solutions/hardware/docs/html/817-6210-10/glossary.html">http://www.sun.com/products-n-solutions/hardware/docs/html/817-6210-10/glossary.html</a> )
<b>Family of Interoperable Operational Pictures</b>	<b>FIOP</b>	The Family of Interoperable Operational Pictures (FIOP) is a methodology for the Services, CINCs, DoD components, and other agencies to look across programs/initiatives and outline an implementation strategy that enables execution of operations accomplished during combat operations to achieve decision superiority. Some important assumptions are that the methodology acknowledges already existing NCW architectures such as those employed by the COP and SIAP and that the provided to the warfighter must be more than a visualization tool and must be focused on execution of combat operations. <a href="http://www.DoD.mil/nii/NCW/ncw_appendix.pdf">http://www.DoD.mil/nii/NCW/ncw_appendix.pdf</a>
<b>Font</b>		A font is a set of glyphs, all observing the same basic motif according to design, size, appearance, and other characteristics associated with the entire set, and a mapping from characters to abstract glyphs. <a href="http://www.w3.org/TR/FONT/">http://www.w3.org/TR/FONT/</a>
<b>Font Family</b>		The font family specifies which font family is to be used to render the text. A font family is a group of fonts that are used in combination and exhibiting similarities in design. One member of the family may be italic, another may be bold, condensed or using small caps. Font family names include "Helvetica", "New Century Schoolbook", and "Times New Roman".

Font family names are not restricted to Latin characters. Font families may be grouped into different categories without serifs, those whose characters are or are not proportionally spaced, those that resemble handwriting, fantasy fonts, etc. . <http://www.w3.org/TR/REC-CSS2/fonts.html>

<b>Font Size</b>	The font size refers to the size of the font from baseline to baseline, when set solid (in CSS terms, this is 'font-size' and 'line-height' properties have the same value). . <a href="http://www.w3.org/TR/REC-CSS2/fonts.html">http://www.w3.org/TR/REC-CSS2/fonts.html</a>
<b>Font Stretch</b>	The font stretch indicates the desired amount of condensing or expansion in the glyphs used to render the text in the same font family. . <a href="http://www.w3.org/TR/REC-CSS2/fonts.html">http://www.w3.org/TR/REC-CSS2/fonts.html</a>
<b>Font Style</b>	The font style specifies whether the text is to be rendered using a normal, italic, or oblique face. Italic is a companion face to the normal face, but not so cursive as to make it a script face. Oblique is a slanted form and is more commonly used as a companion face to sans serif. This definition avoids having to label slight faces as oblique, or normal Greek faces as italic. . <a href="http://www.w3.org/TR/REC-CSS2/fonts.html">http://www.w3.org/TR/REC-CSS2/fonts.html</a>
<b>Font Variant</b>	The font variant indicates whether the text is to be rendered using the normal glyphs for lowercase characters or small-caps glyphs for lowercase characters. A particular font may contain only normal, only small-caps, or both. The font-variant property is used to request an appropriate font and, if the font contains both variants, the appropriate glyphs. . <a href="http://www.w3.org/TR/REC-CSS2/fonts.html">http://www.w3.org/TR/REC-CSS2/fonts.html</a>
<b>Font Weight</b>	The font weight refers to the boldness or lightness of the glyphs used to render the text, relative to other fonts in the family. . <a href="http://www.w3.org/TR/REC-CSS2/fonts.html">http://www.w3.org/TR/REC-CSS2/fonts.html</a>
<b>Force</b>	(1) An aggregation of military personnel, weapon systems, vehicles, and necessary support, or combination thereof, constituting a major subdivision of a fleet.
<b>FORCEnet</b>	An operational construct and architectural framework that integrates the SEAPOWER21 concepts of Sea Basing and Sea Basing by connecting warriors; sensors, networks; command and control; platforms and weapon systems; and accelerated speed and accuracy of decision; and integrating knowledge to dominate the battlespace. FORCEnet provides the following capabilities: expeditionary, multi-tiered, sensor and weapon grids; distributed, collaborative, command and control; dynamic, multi-path survivable networks; adaptive/automated decision aids; and human-centric integration.
<b>Foreign Key</b> <b>FK</b>	An attribute in a relation of a database that serves as the primary key of another relation in the same database.



**Foreign Military Sales**    **FMS**

**Formatting Toolbar**    Toolbar normally displayed directly under the Standard toolbar that contains [http://web.mit.edu/abiword\\_v2.0.10/Tutorials/klw/glossary.html](http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html)



<b>Free Software</b>	Free software is software whose license terms do not restrict the users in the ways that they can run, copy, change, and improve the software. By definition, free software is open-source. In this definition, "free" refers to acquiring or using the software but rather to how the software can be used. (Source: GNU.org: <a href="http://www.gnu.org/philosophy/free-sw.html">http://www.gnu.org/philosophy/free-sw.html</a> )
<b>Freeware</b>	The term "freeware" has no single definition, but is commonly used to refer to software whose license terms allow redistribution but not modification. Usually, the source code for freeware is not available. (Source: GNU: <a href="http://www.gnu.org/philosophy/categories.html">http://www.gnu.org/philosophy/categories.html</a> )
<b>Functional Analysis</b>	Examination of a defined function to identify all the subfunctions necessary to the accomplishment of that function. Identification of functional relationships and interfaces (internal and external) and the capture of these in a functional architecture. The flow down of upper-level performance requirements and the assignment of these requirements to sub-functions.
<b>Functional Architecture</b>	An arrangement of functions and their subfunctions and interfaces (internal and external) that defines the sequencing, conditions for control or data flow, and the performance requirements to satisfy the requirements. (Source: IEEE 1220)
<b>Functional Requirements</b>	Specific actions that a system must be able to perform, without taking physical constraints into consideration. They are best described in a use-case model and in use cases. Functional requirements specify the input and output of the system.
<b>Future Combat Systems</b>	FCS

# G

## G

<b>General InterORB Protocol</b>	<b>GIOP</b>	
<b>General Public License</b>	<b>GPL</b>	A license that defines a specific set of distribution terms for free software. A GPL specifically does not let redistributors add any additional restrictions when they redistribute or modify the software. This means that every copy of the software, even if it has been modified, must be free software. (Source: <a href="http://www.gnu.org/copyleft/gpl.html">http://www.gnu.org/copyleft/gpl.html</a> )
<b>Geographic Objects Initiative, Phase 1</b>	<b>GO-1</b>	Interoperability initiative and specification from Open GIS Consortium on GIS APIs. (Source: <a href="http://ip.opengis.org/go1/">http://ip.opengis.org/go1/</a> )
<b>GIG Enterprise Service</b>		A service that provides capabilities for use in the DoD enterprise. GIG Enterprise Services are the combination of Core Enterprise Services and Community of Interest Services. Also referred to as Global Enterprise Services.
<b>Global Combat Support System</b>	<b>GCSS</b>	
<b>Global Command and Control System</b>	<b>GCCS</b>	
<b>Global Command and Control System - Maritime</b>	<b>GCCS-M</b>	GCCS-M [AN/USQ-119E(V)], previously the Joint Maritime Command Information System (JMCIS), is the Navy's primary fielded Command and Control System. It is a globally interconnected, end-to-end set of information capabilities, associated processes, and personnel. It collects, processes, stores, disseminates, and manages information on demand to warfighters, policy makers, and support personnel. It uses this data to execute the full range of Navy missions (e.g., strategic deterrence, sea control, power projection, etc.) in near-real-time via external communication channels, local area networks (LANs), and direct interfaces with other systems.
<b>Global Information Grid</b>	<b>GIG</b>	Globally interconnected, end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel. The GIG includes all owned and leased communications and computing systems and services, software (including applications), data, security services, and other associated services necessary to achieve Information Superiority. It also includes National Security Systems (NSS) as defined in section 5142 of the Clinger-Cohen Act of 1996. The GIG supports all DoD, National

Security, and related Intelligence Community (IC) missions and functions (strategic, operational, tactical, and business) in war and in peace. The GIG provides capabilities from all operating locations (bases, posts, camps, stations, facilities, mobile platforms, and deployed sites). The GIG provides interfaces to coalition, allied, and non-DoD users and systems.

**Global  
Information Grid  
Bandwidth  
Expansion**      **GIG-BE**

**Global  
Information Grid  
Enterprise  
Services**      **GIG-ES**

**Glyph**      A glyph is the actual artistic representation of an abstract glyph, in some typographic style, in the form of outlines or bitmaps that may be drawn on the screen or paper.  
<http://www.w3.org/TR/REC-CSS2/fonts.html>

**Government Off-  
The-Shelf**      **GOTS**

**Graphic  
Interchange  
Format**      **GIF**

**Graphical User  
Interface**      **GUI**      A program that lets the user interact with a computer system in a highly visual manner, with a minimum of typing. Graphical user interfaces usually require a high-resolution display and a pointing device, such as a computer mouse.  
<http://www.oreilly.com/catalog/debian/chapter/book/glossary.html>

**Group**      An authenticated set of users classified by common traits such as job title or customer profile. Groups are also associated with a set of roles, and every user that is a member of a group inherits all the roles assigned to that group. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html>) -OR- (1) A flexible administrative and tactical unit composed of either two or more battalions or two or more squadrons. The term also applies to combat support and combat service support units. (2) A number of ships and/or aircraft, normally a subdivision of a force, assigned for a specific purpose.

## H

### Hard Real-Time

## H

A system is said to be hard real-time if the correctness of an operation depends not only upon the logical correctness of the operation but also upon the time at which it is performed. An operation performed after the deadline is, by definition, incorrect, and usually has no value. In a soft real-time system the value of an operation declines steadily after the deadline expires. (Source: [http://en.wikipedia.org/wiki/Real\\_time](http://en.wikipedia.org/wiki/Real_time))

### Health Insurance Portability and Accountability Act

### HIPPA

### Heterogeneous Replication

Data transfer between the same or different RDBMS vendors: for example, Oracle to Oracle, or Oracle to Sybase to SQL Server to MySQL. Heterogeneous replication is proprietary to the heterogeneous vendor but reduces the dependency on a specific RDBMS vendor.

### Hierarchical Database

A hierarchical database defines a set of parent-child relationships. Their use should be limited to integration of existing databases, such as IBM's Information Management System (IMS). Hierarchical database systems require developers to predict all possible access patterns in advance and design the database accordingly. A database access pattern that is not included in the design becomes very difficult and inefficient.

### High Assurance Internet Protocol Encryption

### HAIPE

### High Availability

Data tier availability can be affected by hardware failure, power outages, data errors, user errors, programmer errors, OS errors, and RDBMS errors. Various hardware and software methods help mitigate availability issues. The more reliable a system needs to be, the more it costs. Consequently, defining availability to meet requirements is essential to controlling costs.

### High-Order Language

Any programming language that requires little knowledge of the computer hardware on which a program will run, can be translated into several different machine languages, allows symbolic naming of operations and addresses, provides features designed to facilitate expression of data structures

		and program logic, and usually results in several machine instructions for each program statement. Examples include Ada, ALGOL, COBOL, FORTRAN, Pascal. (Source: IEEE Std 610.13-1993. IEEE Standard Glossary of Computer Languages)
<b>Homogeneous Replication</b>		Data transfer between two databases that are implemented using the same RDBMS provider: for example, between two Sybase or two Oracle RDBMSs.
<b>Human Computer Interaction</b>	<b>HCI</b>	Human-Computer Interaction is the study, planning, and design of the interaction between humans and a computer work together. It consists of three parts: the user, the computer itself, and the ways they work together.
<b>Human Perspective</b>		
<b>Human Systems Integration</b>	<b>HIS</b>	Human Systems Integration is part of DOD Directive 5000.1 and is intended to assist program managers by focusing attention on the human part of the system and by integrating and inserting manpower, personnel, training, human factors, safety, occupational health, habitability, and personnel survivability considerations into the Defense acquisition process. <a href="http://akss.dau.mil/dag/Guidebook/IG_c6.1.asp">http://akss.dau.mil/dag/Guidebook/IG_c6.1.asp</a>
<b>Hypertext Markup Language</b>	<b>HTML</b>	A markup language for hypertext documents on the Internet. HTML supports embedding images, sounds, video streams, form fields, references to other objects with URLs, and basic text formatting. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Hypertext Transfer Protocol</b>	<b>HTTP</b>	The Internet protocol used to retrieve hypertext objects from remote hosts. HTTP messages consist of requests from client to server and responses from server to client. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Hypertext Transmission Protocol over SSL</b>	<b>HTTPS</b>	HTTPS is the secure version of HTTP, the communication protocol of the World Wide Web. It was invented by Netscape Communications Corporation to provide authentication and encrypted communication and is used in electronic commerce.  Instead of using plain text socket communication, HTTPS encrypts the session data using either a version of the SSL (Secure Socket Layer) protocol or the TLS (Transport Layer Security) protocol, thus ensuring reasonable protection from eavesdroppers, and man in the middle attacks. The default TCP/IP port of HTTPS is 443. <a href="http://en.wikipedia.org/wiki/HTTPS">http://en.wikipedia.org/wiki/HTTPS</a>

# I

		<h1>I</h1>
<b>Identification</b>	<b>ID</b>	<p>(1) Identification is the Identity, Category, Platform, Type, Activity, and Nationality/Alliance of the track.</p> <p>(2) The process of determining the friendly or hostile character of an unknown detected contact.</p>
<b>Identity</b>		<p>Identity refers to the nature or attributes of the track: Friend, Assumed Friend, Neutral, Unknown, Pending, Suspect, or Hostile.</p>
<b>Image Map</b>		<p>An image or graphic that has been coded to contain interactive areas. When it is clicked on, it launches another Web page or program. An imagemap usually has many different hyperlinked areas, known as links. For example, an imagemap of a country could be coded so that when a user clicks on a city or region, the browser is routed to a document or Web page about that place. <a href="#">netlingo imagemap</a></p>
<b>Implementation Requirement</b>		<p>A requirement that specifies or constrains the coding or construction of a system or system component. See also requirements. (Source: IEEE Std 610.12-1990)</p>
<b>In Accordance With</b>	<b>IAW</b>	
<b>Incremental Upgrade</b>		<p>Certain capabilities can be modernized without impacting other capabilities.</p>
<b>Information</b>		<p>Data to which meaning is assigned, according to context and assumed conventions. Data that has been interpreted, translated, or transformed to reveal the underlying meaning.</p>
<b>Information Assurance</b>	<b>IA</b>	<p>Measures taken to protect and defend our information and information systems to ensure Confidentiality, Integrity, Availability, and Accountability, extended to restoration with protect, detect, monitor, and react capabilities.</p>
<b>Information Technology</b>	<b>IT</b>	
<b>Information Technology Infrastructure Library</b>	<b>ITIL</b>	
<b>Infrastructure</b>		
<b>Initial Capabilities</b>	<b>ICD</b>	

**Document****Inline Network  
Encryptor****INE****Inline Style Sheets**

Style sheets are placed in each individual HTML tag. They override linked and embedded style sheets.

&lt;p

```
STYLE="font-family: Arial,sans-
serif;font-size : 10pt">
My paragraph text.
</p>
```

**Integrated Architecture  
Behavior Model****IABM****Integrated C4I System  
Framework****ICSF**

Defines capability gaps in terms of functional area(s), relevant range of military ops, time, obstacles to overcome, and key attributes, with appropriate measures of effectiveness. Recommends materiel approach(es) based on cost analysis, efficacy, sustainability, environmental quality impacts, and associated risks.

**Integrated Development  
Environment****IDE****Integrated Support  
Plans****ISP**

Describes system dependencies and interface requirements. Includes system interface descriptions, infrastructure and support requirements, standards profiles, performance measures, and interoperability issues.

**Integration**

Integration is the action or process of combining elements so that they become a whole. Vertical integration acts within a system, whereas horizontal integration acts between or among systems. In the net-centric environment, integration creates links between computer systems, applications, services, or processes. The word is normally used in the context of computing, but can apply to business processes as much as to the underlying process automation. In the past, computer integration such as enterprise application integration (EAI) has typically been tightly coupled, or "hard wired," making it difficult to adapt to changing requirements. Thanks to the advent of web services and the evolution of service-oriented architectures, more agile, loosely coupled forms of integration are starting to emerge.

<b>Integrity</b>		The property that data has not been modified (digital signature).
<b>INTEL-Generated Track</b>		Track based on INTEL data that is of sufficient quality for correlation/association with a system track.
<b>Intellectual Property</b>		The products resulting from intellectual effort and covered by a set of laws governing use of these products. These laws cover patents, copyrights, and trade secrets, and are conveyed by specific license terms and conditions describing allowable use. See also software licenses, software patents, copyrights.
<b>Intelligence Community</b>	<b>IC</b>	
<b>Intelligence, Surveillance, and Reconnaissance</b>	<b>ISR</b>	
<b>Interface</b>		The functional and physical characteristics required to exist at a common boundary or connection between systems or items. (Source: DoD 4120.214-M)
<b>Interface Definition Language</b>	<b>IDL</b>	A language used to define interfaces to remote CORBA objects. The interfaces are independent of operating systems and programming languages. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Interface Repository</b>	<b>IFR</b>	
<b>Interface Requirement</b>		A requirement that specifies an external item with which a system or system component must interact, or that sets forth constraints on formats, timing, or other factors caused by such an interaction. (Source: IEEE Std 610.12-1990)
<b>Interface Standard</b>		A standard that specifies the physical, functional, and operational relationships between various hardware and software elements to permit interchangeability, interconnection, compatibility and/or communications.
<b>Interim External Certification Authority</b>	<b>IECA</b>	The Interim External Certification Authority (IECA) PKI program was implemented by DoD to provide a mechanism for industry partners and other external entities and organizations to obtain certificates. The IECA vendors are in the process of transitioning to fully operational External Certification Authorities (ECA). IECA certificates will continue to be accepted until their natural expiration date. Because the ECA is a hierarchical PKI with a Root CA, some applications may choose to only accept ECA certificates as an external PKI.



<http://iase.disa.mil/pki/eca/>

<b>Intermediary</b>		A processing node that is neither the original message sender nor the ultimate receiver.
<b>International Electrical and Electronics Engineers</b>	<b>IEEE</b>	
<b>International Engineering Consortium</b>	<b>IEC</b>	
<b>International Organization for Standardization</b>	<b>ISO</b>	
<b>International Telecommunication Union</b>	<b>ITU</b>	
<b>Internet</b>		<p>The Internet, or simply the Net, is the publicly available worldwide system of interconnected computer networks that transmit data by packet switching using a standardized Internet Protocol (IP) and many other protocols. It is made up of thousands of smaller commercial, academic, and government networks. It carries various information and services, such as electronic mail, online chat and the interlinked web pages and other documents of the World Wide web. Because this is by far the largest, most extensive internet (with a small i) in the world, it is simply called the Internet (with a capital I). (Source: <a href="http://en.wikipedia.org/wiki/Internet">http://en.wikipedia.org/wiki/Internet</a> )</p>
<b>Internet Application Integration</b>	<b>IAI</b>	
<b>Internet Engineering Task Force</b>	<b>IETF</b>	
<b>Internet Information Services</b>	<b>IIS</b>	<p>A set of Internet-based services for Windows machines. Originally supplied as part of the Option Pack for Windows NT, they were subsequently integrated with Windows 2000 and Windows Server 2003. The current (Windows 2003) version is IIS 6.0 and includes servers for FTP, SMTP, NNTP and HTTP/HTTPS. Earlier versions also included a Gopher server.</p>
<b>Internet InterORB Protocol</b>	<b>IIOP</b>	<p>A protocol used for communication between CORBA object request brokers. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )</p>
<b>Internet Protocol</b>	<b>IP</b>	Data packets routed across network, not switched via

dedicated circuits.

**Internet Protocol  
Version 4**

**IPv4**

Version 4 of the Internet Protocol (IP). It was the first version of the Internet Protocol to be widely deployed, and forms the basis for most of the current Internet (as of 2004). It is described in IETF RFC 791, which was first published in September, 1981. IPv4 uses 32-bit addresses, limiting it to 4,294,967,296 unique addresses, many of which are reserved for special purposes such as local networks or multicast addresses. This reduces the number of addresses that can be allocated as public Internet addresses. As the number of addresses available is consumed, an IPv4 address shortage appears to be inevitable in the long run. This limitation has helped stimulate the push towards IPv6, which is currently in the early stages of deployment, and may eventually replace IPv4. (Source: <http://en.wikipedia.org/wiki/IPv4> )

**Internet Protocol  
Version 6**

**IPv6**

Version 6 of the Internet Protocol; it was initially called IP Next Generation (IPng) when it was picked as the winner in the IETF's IPng selection process. IPv6 is intended to replace the previous standard, IPv4, which only supports up to about 4 billion ( $4 \times 10^9$ ) addresses. IPv6 supports up to about  $3.4 \times 10^{38}$  (340 undecillion) addresses. This is the equivalent of  $4.3 \times 10^{20}$  (430 quintillion) addresses per square inch ( $6.7 \times 10^{17}$  (670 quadrillion) addresses/mm<sup>2</sup>) of the Earth's surface. It is expected that IPv4 will be supported until at least 2025, to allow time for bugs and system errors to be corrected. (Source: <http://en.wikipedia.org/wiki/Ipv6> )

**Interoperability**

The ability of systems, units, or forces to (1) provide data, information, materiel, and services to, and accept the same from, other systems, units, or forces, and (2) to use the data, information, materiel, and services so exchanged to enable them to operate effectively together. IT and NSS interoperability includes both the technical exchange of information and the end-to-end operational effectiveness of that exchange of information as required for mission accomplishment. Interoperability is more than just information exchange. It includes systems, processes, procedures, organizations, and missions over the life cycle and must be balanced with information assurance. -OR- The ability for entities to work with each other. In the loosely coupled environment of a service-oriented architecture, separate resources don't need to know the details of how they each work, but they need to have enough common ground to reliably exchange messages without error or misunderstanding. Standardized specifications go a long w

**Intranet**

An intranet is a local area network (LAN) used internally in an organization to facilitate communication and access to information that is sometimes access-restricted. Sometimes the term refers only to the most visible service, the internal web site. The same concepts and technologies of the Internet such as clients and servers running on the Internet protocol suite are used to build an intranet. HTTP and other internet protocols are commonly used as well, especially FTP and email. There is often an attempt to use internet technologies to provide new interfaces with corporate "legacy" data and information systems. (Source: <http://en.wikipedia.org/wiki/Intranet> )

**ISO-11170**

ISO-11179 (formally known as the ISO/IEC 11179 Metadata Registry Standard) is a standard for representing [Metadata](#) for an organization in a [Metadata Registry](#).

**ISO/IEC 11179**

See [ISO-11170](#).

**IT Service Management      ITSM**

## J

### J2EE Application

## J

Any deployable unit of J2EE functionality. This can be a single J2EE module or a group of modules packaged into an EAR file along with a J2EE application deployment descriptor. J2EE applications are typically engineered to be distributed across multiple computing tiers. (Source:

<http://java.sun.com/j2ee/1.4/docs/glossary.html> )

### J2EE Component

A self-contained functional software unit that is supported by a container and is configurable at deployment time. The J2EE specification defines the following J2EE components. (1) Application clients and [applets](#) are components that run on the client. (2) Java servlet and JavaServer Pages (JSP) technology components, web components that run on the server. (3) Enterprise JavaBeans (EJB) components (enterprise beans), business components that run on the server. J2EE components are written in the Java programming language and are compiled in the same way as any program in the language. The difference between J2EE components and "standard" Java classes is that J2EE components are assembled into a J2EE application, verified to be well formed and in compliance with the J2EE specification, and deployed to production, where they are run and managed by the J2EE server or client container. (Source:

<http://java.sun.com/j2ee/1.4/docs/glossary.html> )

### J2EE Connector Architecture

### JCA

### J2EE Module

A software unit that consists of one or more J2EE components of the same container type and one deployment descriptor of that type. There are four types of modules: EJB, web, application client, and resource adapter. Modules can be deployed as standalone units or can be assembled into a J2EE application. (Source:

<http://java.sun.com/j2ee/1.4/docs/glossary.html> )

### J2EE Server

The runtime portion of a J2EE product. A J2EE server provides EJB or web containers or both. (Source:

<http://java.sun.com/j2ee/1.4/docs/glossary.html> )

### Java

Java is a reflective, object-oriented programming language developed initially by at Sun Microsystems.

It was intended to replace C++, although the feature set better resembles that of Objective-C. Java should not be confused with JavaScript, which shares only the name and a similar C-like syntax. Sun Microsystems currently maintains and updates Java regularly.

Specifications of the Java language, the Java Virtual Machine (JVM) and the Java API are community-maintained through the Sun-managed Java Community Process.

## Java Class Files

Class files contain bytecodes for the Java Virtual Machine. They are normally produced by a compiler for the Java programming language.

A Java interpreter can then read these files and execute the code contained within.

## Java 2 Enterprise Edition J2EE

The J2EE environment is the standard for developing component-based multi-tier enterprise applications. The J2EE platform consists of a set of services, application programming interfaces (APIs), and protocols that provide the functionality for developing multitiered, web-based applications. Features include web-services support and development tools. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

## Java Archive JAR

A platform-independent file format that enables you to bundle multiple files into a single archive file. JAR files are packaged with the ZIP file format, so you can use them for ZIP-like tasks such as lossless data compression, archiving, decompression, and archive unpacking. Typically JAR files contain the class files and auxiliary resources associated with applets and applications. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

## Java Authentication and Authorization Service JAAS

## Java Connector Architecture J2A

## Java Cryptography Architecture JCA

## Java Database Connection JDBC

An API that supports database and data-source access from Java applications.

## Java Development Kits JDK

## Java Foundation Classes JFC

The Java Foundation Classes are a set of Java class libraries provided as part of the Java 2 Platform,

		Standard Edition (J2SE) to support building graphical user interfaces (GUI) and graphics functionality for client applications that will run on popular platforms such as Microsoft Windows, Linux, and Mac OSX.
<b>Java Message Service</b>	<b>JMS</b>	An API for invoking operations on enterprise messaging systems. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Java Message Service / Application Messaging Interface</b>	<b>JMS/AMI</b>	
<b>Java Naming and Directory Interface</b>	<b>JNDI</b>	An API that provides naming and directory functionality. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Java Secure Socket Extension</b>	<b>JSSE</b>	A set of packages that enables secure Internet communications. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Java Server Faces</b>		A framework for building user interfaces for web applications. It includes (1) A set of APIs for representing UI components and managing their state, handling events and input validation, defining page navigation, and supporting internationalization and accessibility; (2) A JavaServer Pages (JSP) custom tag library for expressing a JavaServer Faces interface within a JSP page.
<b>Java Server Page</b>	<b>JSP</b>	An extensible web technology that uses static data, JSP elements, and server-side Java objects to generate dynamic content for a client. Typically the static data is HTML or XML elements, and in many cases the client is a web browser. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Java Specification Request</b>	<b>JSR</b>	
<b>Java Transaction API</b>	<b>JTA</b>	JTA specifies standard Java interfaces between a transaction manager and the parties involved in a distributed transaction system: the resource manager, the application server, and the transactional applications.
<b>Java Virtual Machine</b>	<b>JVM</b>	
<b>JavaBean</b>		A specification developed by Sun Microsystems that defines how Java objects interact and is similar to an ActiveX control. It can be used by any application that understands the JavaBean format.
<b>JavaMail</b>		A platform- and protocol-independent framework for

building Java-based mail client applications.

**JavaScript**

The Netscape-developed object scripting language used in millions of web pages and server applications worldwide. Contrary to popular misconception, JavaScript is not "Interpretive Java." Rather, it is a dynamic scripting language that supports prototype-based object construction.

**JMS Client**

A Java-base application or object that produces and consumes messages, where messages are objects that contain the data being transferred between JMS clients.

**JMS Connection Class**

Once a connection factory is obtained, a connection to a JMS provider (MOM) can be created. A connection represents a communication link between the application and the messaging server. Depending on the connection type, connections allow users to create sessions for sending and receiving messages from a queue or topic.

**JMS Connection Factory Class**

An administered object that a client uses to create a connection to the JMS provider (MOM). JMS clients access the connection factory through portable interfaces so the code does not need to be changed if the underlying implementation (MOM) changes. Administrators configure the connection factory in the Java Naming and Directory Interface (JNDI) namespace so that JMS clients can look them up. Depending on the type of message, users will use either a queue connection factory or topic connection factory.

**JMS Destination Class**

An administered object that encapsulates the identity of a message destination, which is where messages are delivered and consumed. It is either a queue or a topic. The JMS administrator creates these objects, and users discover them using JNDI. Like the connection factory, the administrator can create two types of destinations: queues for Point-to-Point and topics for Publish/Subscribe.

**JMS Message Consumer Class**

An object created by a session. It receives messages sent to a destination. The consumer can receive messages synchronously (blocking) or asynchronously (non-blocking) for both queue and topic-type messaging.

**JMS Message Producer Class**

An object created by a session that sends messages to a destination. The user can create a sender to a specific destination or create a generic sender that specifies the destination at the time the message is sent.

**JMS Messages**

Objects that contain the data being transferred between JMS clients. Java base applications or objects that produce and consume messages, where messages are objects that contain the data being transferred between JMS clients.

**JMS Messages Class**

An object that is sent between consumers and producers; that is, from one application to another. A message has three main parts: (1) A message header (required): Contains operational settings to identify and route messages; (2) A set of message properties (optional): Contains additional properties to support compatibility with other providers or users. It can be used to create custom fields or filters (selectors). (3) A message body (optional): Allows users to create five types of messages (text message, map message, bytes message, stream message, and object message). The message interface is extremely flexible and provides numerous ways to customize the contents of a message.

**JMS Provider**

Represents a JMS interface to the MOM. It implements the JMS interface, which is a specification published by Sun. It is basically an adapter to the MOM.

**JMS Session Class**

Represents a single-threaded context for sending and receiving messages. A session is single-threaded so that messages are serialized, meaning that messages are received one-by-one in the order sent. The benefit of a session is that it supports transactions. If the user selects transaction support, the session context holds a group of messages until the transaction is committed, then delivers the messages. Before committing the transaction, the user can cancel the messages using a rollback operation. A session allows users to create message producers to send messages, and message consumers to receive messages.

**Joint**

Connotes activities, operations, organizations, etc., in which elements of two or more military departments participate.

**Joint Application Development**

**JAD**

**Joint Capabilities Integration and Development System**

**JCIDS**

**Joint Command and Control**

**JC2**

**Joint Composite Tracking Network**

Generic title for a joint telecommunications network and processing capability to enable composite tracking among joint, heterogeneous mixes of sensors



**(JCTN)**

and to support appropriate levels of cooperative engagement of targets by weapons systems. It is envisioned as a real-time, sensor fusion system that distributes and fuses sensor measurement data into composite tracks that create a high-fidelity, coherent air picture. The JCTN is a concept rooted in the Navy's experience with Cooperative Engagement Capability (CEC). It includes common software and a communications element that allow participating units to share fused sensor data. The communications structure as currently envisioned includes wide-band line-of-sight communications, satellite links, and other communication systems.

**Joint Data Network  
(JDN)**

A collection of near-real-time communications and information systems used primarily at the coordination and execution level. It provides information exchange necessary to facilitate the Joint/Service Battle Manager's comprehension of the tactical situation, and also provides the means to exercise command and control beyond the range of organic sensors. The JDN carries near-real-time tracks, unit status information, engagement status and coordination data, and force orders. JDN information is used to cue radars as well. The backbone of the JDN is Link-16. However, other data links such as TADILA/B/C, Link-22, and VMF (Variable Message Format) will exchange information with the JDN through gateways at various platforms to ensure that disadvantaged users are included in the JDN. Satellites link geographically dispersed users in near real-time without consuming limited tactical bandwidth.

**Joint Enterprise DoDIIS JEDI  
Infrastructure**

Joint Enterprise DoDIIS Infrastructure

**Joint Force**

A general term applied to a force composed of significant elements, assigned or attached, of two or more military departments operating under a single joint force commander.

**Joint Forces JFC  
Commander****Joint Intelligence Center JIC****Joint Interoperability JITC  
Test Command**

An organization that will certified application's ability to interoperate with the DOD PKI.

**Joint Photographic JPEG  
Experts Group – a file  
format**

**Joint Planning Network (JPN)**

A collection of non-real-time and near real-time communication and information systems. JPN provides distributed collaborative planning capability, automated decision aids, and a means for distributing plans within theater. The core of the JPN is the Global Command and Control System (GCCS) operating in the Defense Information Infrastructure Common Operating Environment (DII COE).

**Joint Program Office JPO**

**Joint Tactical Air Request JTAR**

**Joint Tactical Radio System JTRS**

**Joint Task Force**

Joint force that is constituted and so designated by the Secretary of Defense, a combatant commander, a sub-unified commander, or an existing joint task force commander.

**Joint Technical Architecture JTA**

**JScript**

Microsoft's extended implementation of ECMAScript (ECMA262), an international standard based on Netscape's JavaScript and Microsoft's JScript languages. JScript is implemented as a Windows Script engine. This means that you can plug it in to any application that supports Windows Script, such as Internet Explorer, Active Server Pages, and Windows Script Host. It also means that any application supporting Windows Script can use multiple languages: JScript, VBScript, Perl, and others.

**JSP Page**

A text-based document containing static text and JSP elements that describes how to process a request to create a response. A JSP page is translated into and handles requests as a servlet. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Just-In-Time Compilation JIT**

This is the primary method by which .NET executes MSIL. As the MSIL is executed, the code is compiled and optimized for the executing environment. JIT compilation provides environment optimization, runtime type safety, and assembly verification. To accomplish this, the JIT compiler examines the assembly metadata for any illegal accesses and handles violations appropriately.

# K

## K

**Key Interface Profile      KIP**

**Key Performance  
Parameter      KPP**

**Key Recovery Manager      KRM**

A service of the DOD PKI where copies of key pairs used for encryption are stored and can be recovered for law enforcement purposes.

**Note:** This definition is derived from the DoD Class 3 PKI – Public Key-Enabled

**Keystore**

A file containing the keys and certificates used for authentication. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Kinematics**

Position, Velocity, and Acceleration.

**Knowledge**

(Unlike information or data) Requires the presence of context, semantics, and purpose.

**Knowledge Pyramid**

**Data --> Information --> Knowledge -->  
Wisdom**

# L

# L

## Land C2 Information LC2IEDM Exchange Data Model

### Landscape

This is the way you would see a brochure. You can also think of it as being related to the horizon, which is how most landscape photographs are oriented. Since the horizon is infinitely long, the longest edge of the photograph was horizontal to include as much of the horizon as possible.

[http://web.mit.edu/abiword\\_v2.0.10/Tutorials/klw/glossary.html](http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html)

### Layered Software Architecture

Application software is separated into n tiers that separate concerns; minimally, client, presentation, middle, and data tiers

### Least-Common-Denominator Data Access Mechanism

When one application is able to obtain data provided by another by removing arbitrary implementation barriers to data exchange.

### Light Directory Access Protocol LDAP

A set of protocols for accessing information directories. LDAP is a simpler version of the X.500 standard. Unlike X.500, LD Web Services for Interactive Applications AP supports TCP/IP, which is necessary for Internet access. Because it's a simpler version of X.500, LDAP is sometimes called X.500-lite.

LDAP is a protocol for accessing on-line directory services.

<http://en.wikipedia.org/wiki/LDAP>

### Linked Style Sheets

Style sheets that are placed in a separate text files and saved in the root with a **css** file extension. A link to the file is made in the head section of the document.

```
<head>
  <link
    rel="stylesheet"
    href="mystyle.css"
    type="text/css">
</head>
```

### Local Area Network LAN

A group of interconnected computer and support devices.

(Source: <http://www.sun.com/products-n-solutions/hardware/docs/html/817-6210-10/glossary.html> )

### Local Track

A track established within a unit based on sensor measurements derived from the local platform sensors.

**Logical Architecture**

The logical architecture adds precision, providing a detailed “blueprint” from which component developers and component users can work in relative independence. It incorporates the detailed architecture diagram (with interfaces), component and interface specifications, and component collaboration diagrams, along with discussion of mechanisms, rationale, etc.

**Look And Feel**

Look and feel refers to design aspects of a graphical user interface – in terms of colors, shapes, layout, typefaces, etc (the “look”); and, the behavior of dynamic elements such as buttons, boxes, and menus (the “feel”). It is used in reference to both software and websites.

[http://en.wikipedia.org/wiki/Look\\_and\\_feel](http://en.wikipedia.org/wiki/Look_and_feel)

**Look Aspect**

One of the traditional aspects of a graphical user interface. The “look” covers such things as colors, shapes, layout, and typefaces.

**Loosely Coupled**

A computing model where application elements require a simple level of coordination and allow for flexible reconfiguration. Interconnection is often asynchronous and message-based.

# M

## M

**Maintenance  
Operation  
Protocol**

**MOP**

**Major  
Automated  
Information  
System**

**MAIS**

**Manual  
Track**

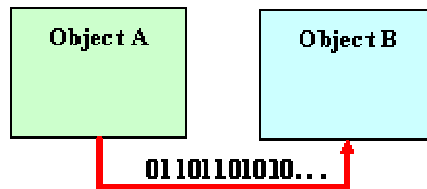
A track that is entered and updated by an operator. It may represent an object not seen by current sensors or provide a different representation of an entity than is currently being depicted by the sensors. In addition to system track correlation, the operator has the ability to associate or correlate this track with other tracks.

**Map Objects  
Java Edition**

**MOJE**

**Marshalling**

The process of transferring data using [serialization](#) and [deserialization](#) is called marshalling.



**Measurement**

A sensor-derived detection, contact, hit, or observation at a given point in time.

**Measurement  
Report**

A detection from a single sensor which has not yet been subjected to an association process.

**Mediation**

Mediation is defined as a set of negotiated agreements for interacting between components that enable those components to work together to perform a task. These agreements are defined through standard interfaces and data interchange specifications.

Mediation services provide multiple methods for integrating data sources and services:

- [Transformation](#)
- [Aggregation](#)
- [Adaptation](#)
- [Orchestration](#)

- [Choreography](#)

<b>Mediation Software</b>		Can convert data to a common format or merge disparate formats
<b>Memory Management Unit</b>	<b>MMU</b>	
<b>Menu Bar</b>		A horizontal list of commands or options from which you can choose that appears on top of a window. <a href="http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html">http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html</a>
<b>Message</b>		A complete unit of data available to be sent or received by services. It is a self-contained unit of information exchange. A message always contains a SOAP envelope, and may include additional MIME parts as specified in MTOM, and/or transport.
<b>Message Bean</b>		An enterprise bean that provides asynchronous message support and clearly separates message and business processing.
<b>Message Path</b>		Set of SOAP nodes traversed between the original source and ultimate receiver.
<b>Message-Oriented Middleware</b>	<b>MOM</b>	
<b>Metadata</b>		Data about the data, that is, the description of the data resources, its characteristics, location, usage, and so on. Metadata is used to identify, describe, and define user data.
<b>Metadata Catalog</b>		
<b>Metadata Registry</b>		<p>A Metadata Registry is a central place where metadata definitions are stored and maintained.</p> <p>A Metadata registry typically has the following characteristics:</p> <ul style="list-style-type: none"> <li>• It is a protected area where only approved individuals may make changes</li> <li>• It stores <a href="#">data elements</a> that include both semantics and representations</li> <li>• The semantic areas of a metadata registry contain the meaning of a Data Element with precise definitions</li> <li>• The representational areas define how the data is represented in a specific format such as within a database or a structure file format such as <a href="#">XML</a></li> </ul> <p>Metadata Registries often are stored in an international format called <a href="#">ISO-11170</a>.</p> <p>A Metadata Registry is frequently set up and administered by an organization's <a href="#">Data architect</a> or data modeling team. <a href="http://en.wikipedia.org/wiki/Metadata_registry">http://en.wikipedia.org/wiki/Metadata_registry</a></p>
<b>Microsoft Developer</b>	<b>MSDN</b>	The Microsoft Developer Network is the portion of Microsoft responsible for managing the firm's relationship with developers. This includes many different kinds of developers: hardware developers interested in the operating system (OS),

**Network**

developers standing on the the various OS platforms, developers leveraging the API and scripting languages of Microsoft's many applications. The relationship management is situated in assorted media: web sites, newsletters, developer conferences, trade media, blogs and DVD distribution. The life cycle of the relationships ranges from legacy support thru evangelizing potential offerings.

<http://en.wikipedia.org/wiki/MSDN>

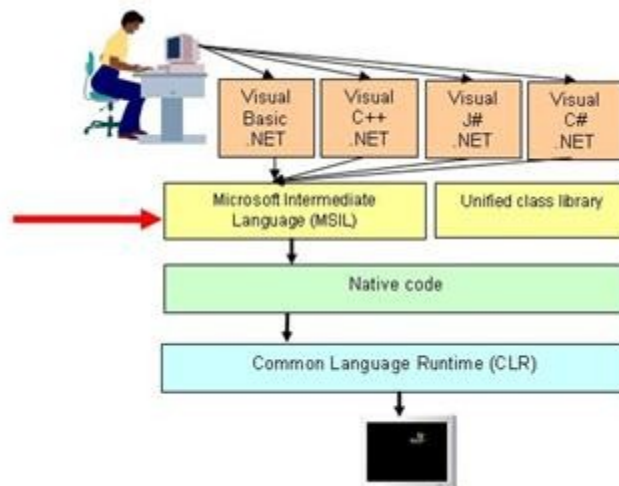
**Microsoft Intermediate Language****MSIL**

An intermediate instruction set into which all [.NET](#) languages compile. You can execute MSIL code on any environment that supports the [.NET](#) framework. MSIL-compiled code is verified for safety during runtime, providing better security and reliability than natively compiled binaries.

During compilation, [.NET](#) code is translated into Microsoft Intermediate Language (MSIL) rather than machine-specific binary code. MSIL is a machine- and platform-independent instruction set that can be executed in any environment within the [.NET](#) framework. [.NET](#) uses [just-in-time \(JIT\) compilation](#) as its primary means of executing MSIL. You can generate native binary images using Microsoft's Native Image Generator ([NGEN](#)).

Compiling [.NET](#) code produces two things:

- [Microsoft Intermediate Language \(MSIL\)](#)
- MSIL Metadata - Information about the MSIL-compiled classes. Metadata in [.NET](#) serves the same purpose as a [COM-type](#) library. Metadata enables applications to support and discover the interfaces of classes in the assembly. The process of reading metadata is reflection. Metadata shows developers the methods and other information for particular classes. To view an assembly's metadata, use the Intermediate Language Disassembler (ILDASM).

**Microsoft Message Queue****MSMQ**

Messaging in [.NET](#) uses Microsoft Message Queue (MSMQ). MSMQ is responsible for reliably delivering [messages](#) between applications inside and outside the enterprise. MSMQ ensures reliable delivery by placing [messages](#) that fail to reach their intended



destination in a queue and then resending them once the destination is reachable.



MSMQ also supports transactions. It permits multiple operations on multiple queues, with all of the operations wrapped in a single transaction, thus ensuring that either all or none of the operations will take effect. Microsoft Distributed Transaction Coordinator (MSDTC) supports transactional access to MSMQ and other resources.

<b>Milestone Decision Authority</b>	<b>MDA</b>	
<b>MIME HTML</b>	<b>MHTML</b>	
<b>Mission</b>		The task, together with the purpose, that clearly indicates the action to be taken and the reason for that action.
<b>Mission Capability Package</b>	<b>MCP</b>	
<b>Mission-Essential Task</b>	<b>MET</b>	A task selected by a force commander from the Universal Navy Task List (UNTL) deemed essential to mission accomplishment.
<b>Mission-Essential Task List</b>	<b>METL</b>	A list of tasks considered essential to the accomplishment of assigned or anticipated missions. A METL includes associated conditions and standards and may identify command-linked and supporting tasks.
<b>Modal Dialog</b>		A dialog box that puts the user in the state or mode of being able to work only inside the dialog box. A modal dialog box resembles an alert box. The user cannot move a modal dialog box and can dismiss it only by clicking its buttons.
<b>Model 4</b>		TADIL A Taxonomy (Link-11)
<b>Model 5</b>		TADIL J Taxonomy (Link-16)
<b>Model Driven Development</b>	<b>MDD</b>	A general class of software development processes and techniques that emphasizes the use of models as a key element in the development. MDA™ is an example of one approach to MDD.
<b>Model-Driven Architecture</b>	<b>MDA</b>	Model-driven architecture™ is a trademarked term denoting a specific approach to the development of software using models as the basis. The MDA™ specifies system functionality separately from the implementation of that functionality on a specific technology platform. To accomplish this goal, the MDA™ defines an architecture that provides a set of guidelines for structuring specifications expressed as models. The MDA™ model architecture relates multiple standards, including Unified Modeling

Language™ (UML™), the Meta Object Facility™ (MOF™), the XML Metadata interchange(XMI™), and the Common Warehouse Metamodel (CWM™). Note that the term "architecture" in MM does not refer to the architecture of the system being modeled, but rather to the architecture of the various standards and model forms that serve as the technology basis for MDA™.

<b>Modular Design</b>	Characterized by (1) Functional partitioning into discrete scalable, reusable modules consisting of isolated, self-contained functional elements; (2) Rigorous use of welldefined modular interfaces, including object-oriented descriptions of module functionality; (3) Ease of change to achieve technology transparency and, to the extent possible, make use of industry standards for key interfaces.
<b>Modular Open Systems Approach</b>	<b>MOSA</b>
<b>Module</b>	(1) A program unit that is discrete and identifiable with respect to compiling, combining with other units, and loading; for example, the input to, or output from, an assembler, compiler, linkage editor, or executive routine. (2) A logically separable part of a program. Note: The terms 'module,' 'component,' and 'unit' are often used interchangeably or defined to be sub-elements of one another in different ways depending upon the context. The relationship of these terms is not yet standardized. See also component. (Source: IEEE Std 610.12-1990)
<b>Monospace</b>	The sole criterion of a monospace font is that all glyphs have the same fixed width. (This can make some scripts, such as Arabic, look most peculiar.) The effect is similar to a manual typewriter, and is often used to set samples of computer code. Examples of monospace fonts are: Courier, MS Courier New, Prestige, and Everson Mon. . <a href="http://www.w3.org/TR/REC-CSS2/fonts.html">http://www.w3.org/TR/REC-CSS2/fonts.html</a>
<b>Mouse Over</b>	A term used to indicate the text that appears next to your mouse pointer when you hold a computer mouse over any screen object that is an active link, or over some other GUI element or widget that is capable of performing an action, such as an icon or command button. The mouse over is becoming increasingly popular as a way of improving usability that has been made more practical as software gets more sophisticated and powerful. <a href="http://en.wikipedia.org/wiki/Mouseover">http://en.wikipedia.org/wiki/Mouseover</a>
<b>Multi-Element Array</b>	<b>MEA</b>
<b>Multi-Level Priority and Preemption</b>	<b>MLPP</b>
<b>Multi-Purpose Internet Mail Extensions</b>	<b>MIME</b>
<b>Multi-Sensor Correlated Track</b>	A representation of an entity that is formed by correlating track reports using various methods based upon time latency of the given tracks. These multiple tracks are correlated to form one representation of the track.

**Multi-User  
Access**

A system where multiple users can simultaneously access data stores, use applications, and analyze and direct operations.

**Mutual  
Authentication**

An authentication mechanism employed by two parties for the purpose of proving each other's identity to one another. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html>)

# N

## N

### Namespace

A standard that lets you specify a unique label for the set of element names defined by a DTD or XSD. A document using that DTD or XSD can be included in any other document without causing a conflict between element names. The elements defined in a particular DTD are uniquely identified so that, for example, the parser can tell when an element <name> should be interpreted according to the particular DTD rather than using the definition for an element <name> in a different DTD. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html>)

### Native Image Generator Compilation

#### NGEN

NGEN enables you to produce a native binary image of MSIL code for the current environment. This improves the performance of the .NET application by eliminating the JIT overhead associated with the execution. Once you run NGEN against an assembly, the resulting native image is placed in the Global Assembly Cache for use by all other .NET assemblies.

NGEN is a good tool for improving performance of .NET applications as long as the executing environment remains static. If you execute an NGEN-generated image in an incompatible environment, .NET automatically reverts to using JIT. To mitigate this, run NGEN during deployment against the installed assemblies.

### Native XML Database

Defines a logical model for an XML document (as opposed to the data in that document) and stores and retrieves documents according to that model. These databases are accessed via programming interfaces such as SAX, DOM, or JDOM. There is a trend away from pure XML storage because all the leading relational database vendors are introducing advanced XML capabilities.

### Navigation Bar

A vertical list of commands or options from which you can choose that appear on the left of a window.  
[http://web.mit.edu/abiword\\_v2.0.10/Tutorials/klw/glossary.html](http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html)

### Natural Key

A Natural Key is a primary keys that is made up completely or in part from naturally occurring data in the tables.

<i>Students:</i>			<i>Natural Keys</i>		
Name	Address	Phone	Name	Course #	Name
John Public	200 Ash St, Hometown, USA	800-555-1234	Jane Doe	B100	Intro Bio
Jane Doe	170 Elm Ave, Hometown, USA	800-555-1212	Jane Doe	C100	Intro Chem
			Jane Doe	P100	Intro Play
			Jane Doe	E100	English I
			John Public	C100	Intro Chem
			John Public	P100	Intro Play

If the student name "Jane Doe" changes, all occurrences of the name must be changed.

See [Surrogate Key](#) and [Primary Key](#).

**Navy Marine Corps NMCI Intranet**

**Navy Tactical Task List (NTTL)**

The comprehensive list of Navy and Coast Guard (DoD-related missions) tasks at the tactical level of war.

**NCOW RM**

Net-Centric Operations Warfare Reference Model. An information-enabled concept of operations that generates increased combat power by networking sensors, decision makers, and shooters. This enables shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization. In essence, network-centric warfare translates information superiority into combat power by effectively linking knowledgeable entities in the battlespace.

**Near-Real-Time (Tracks)**

(1) Near-real-time tracks are generated by real-time sensors on remote units, whose delivery latencies are sufficiently large that while they can be used to help decide to engage on the target, they cannot be used to fire on the target. The data is primarily used for situational awareness. (2) The timelines of the data or information have been delayed by the time required for electronic communications and automatic data processing. (Source: 7P1 SS)

**Net**

A globally interconnected, end-to-end set of information capabilities, associated processes, and personnel for data and information exchange.

**Net Centric Data Architecture**

**Net-Centric**

A net-centric environment is one in which users and local applications depend upon common services for functionality and data. Users can access applications and data through web services. This provides an information environment that comprises interoperable computing and communication components. A net-centric environment exploits advancing technology to move from an application-centric to a data-centric paradigm.

**Net-Centric  
Enterprise Services**

**NCES**

The NCES program provides enterprise-level Information Technology (IT) services and infrastructure components, also called Core Enterprise Services, for the Department of Defense (DoD) Global Information Grid (GIG).

**Net-Centric  
Enterprise  
Solutions for  
Interoperability**

**NESI**

A cross service effort between the U.S. Navy's Program Executive Office for C4I & Space and the U.S. Air Force's Electronic Systems Center. It provides a reference architecture, implementation guidance, and a set of reusable software components. These facilitate the design, development, maintenance, evolution, and use of information systems for the Net-Centric Operations and Warfare (NCOW) environment.

**Net-Centric  
Information  
Environment**

A net-centric information environment utilizes emerging standards and technologies to optimize assured information sharing among all users. It results from implementing GIG component architectures in accordance with the NCOW RM. A net-centric information environment is inclusive of Core and COI enterprise services, and a data sharing strategy that emphasizes metadata concepts, shared information spaces, and the task, post, process, use (TPPU) paradigm.

**Net-Centric  
Operations Warfare**

**NCOW**

**Net-Centric  
Operations Warfare  
Reference Model**

**NCOW RM**

**Net-Centric  
Warfare**

**NCW**

**Net-Centricity**

The realization of a robust, globally interconnected, network environment (including infrastructure, systems, processes, people) in which data is shared seamlessly in a timely manner among users, applications, and platforms. By securely interconnecting people and systems, independent of time or location, net-centricity substantially improves military situational awareness and significantly shortens decision-making cycles. Users can better protect assets; exploit information more effectively; use resources more efficiently; and unify our forces by supporting extended, collaborative communities to focus on the mission.

Net-centricity is an information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision-makers, and shooters to achieve

shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization. In essence, (Net-centricity) translates information superiority into combat power by effectively linking knowledgeable entities in the battlespace.

## **NetOps**

An organizational, procedural, and technological construct for ensuring information and decision superiority at the strategic, operational, and tactical levels of warfare as well as within DOD business operations. NetOps is an operational approach, which addresses the interdependency and integration of IA/CND, S&NM, and CS capabilities. NetOps consists of the organizations, tactics, techniques, procedures, functionalities, and technologies required to plan, administer, and monitor use of the GIG infrastructure and the end-to-end information flows of the GIG; and to respond to threats, outages, and other operational impact. NetOps ensures mission requirements are properly considered in GIG operational decision-making. NetOps enables the GIG to provide its users with information they need, when they need it, where they need it, with appropriate protection of the information. NetOps is an essential capability for successful execution of net-centric warfare and other net-centric operations in support of national security objectives.

## **Net-Ready Key Performance Parameter**

### **NR KPP**

Measures the net-centricity of a new program or major upgrade.

## **Network**

A system of computers, terminals, databases, cables, satellites, and other elements that enable digital communications.

## **Network Attached Storage**

### **NAS**

## **Network Centric Operations Industry Consortium**

### **NCOIC**

## **Network Operations**

### **NETOPS**

An organizational, procedural, and technological construct for ensuring information and decision superiority at the strategic, operational, and tactical levels of warfare as well as within DoD business operations. NetOps is an operational approach, which addresses the interdependency and integration of [IA/CND](#), S&NM, and CS capabilities. NetOps consists of the organizations, tactics, techniques, procedures, functionalities, and technologies required to plan, administer, and monitor use of the GIG infrastructure and the end-to-end information flows of the GIG; and to respond to threats, outages, and other operational impact. NetOps ensures mission requirements are properly considered in GIG operational decision-making. NetOps enables the GIG to provide its users with information they need, when and where they need it, with appropriate protection. NetOps is essential for successful execution of net-centric warfare and other net-centric operations in support of

		national security objectives.
<b>NGEN Compilation</b>		Native Image Generator compilation. NGEN enables you to produce a native binary image of MSIL code for the current environment. This improves the performance of the <a href="#">.NET</a> application by eliminating the JIT overhead associated with the execution. Once you run NGEN against an assembly, the resulting native image is placed in the Global Assembly Cache for use by all other <a href="#">.NET</a> assemblies.
<b>Niche Databases</b>		Various vendors create niche databases in response to shortcomings in relational databases. Market domination by large vendors has made it hard for small vendors to break into the market, so niche database vendors mainly provide supporting tools.
<b>Node</b>		A set of information systems acquired and managed as a single element in the net-centric enterprise. In NESI, these entities are designed to support distributed services for a collection of systems, applications, data, and components that share a common set of mission functions on a common infrastructure.
<b>Node Information Services</b>	<b>NIS</b>	
<b>Node Manager</b>		The organization responsible for integrated planning, acquisition, and delivery of integrated, tested, certified C2 Node systems, sub-systems, components, and services.
<b>Node Platform Infrastructure</b>	<b>NPI</b>	A set of information systems and technologies, based on a commercial product stack, that provides an integrated common software component execution framework and infrastructure.
<b>Nonce</b>		A unique random string.
<b>Non-Functional Requirements</b>		Address issues such as reliability, performance, supportability, constraints, and physical matters. Many requirements are non-functional, and describe only attributes of the system or attributes of the system environment. Although some of these may be captured in use cases, those that cannot may be specified in supplementary specifications.
<b>Non-Real Time (Tracks)</b>		(1) Non-real-time tracks have latencies that nominally range from 15 seconds to days. (2) The timelines of the data or information have been delayed such that the data or information has questionable utility beyond situational awareness. (Source: 7P1SS)
<b>Normalization</b>		Normalization avoids duplication of data, insert anomalies, delete anomalies, and update anomalies. A relation is in first normal form (1NF) if and only if all underlying simple domains contain atomic values only. A relation is in second normal form (2NF) if and only if it is in 1NF and every non-key attribute is fully dependent on the primary key. A relation is in third normal form (3NF) if and only if it is in 2NF and every non-key



attribute is non-transitively dependent on the primary key. Data models should follow the three forms unless there is overriding justification not to. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html>)

**North Atlantic  
Treaty Organization**

**NATO**

NATO is an international organization for defense collaboration established in 1949, in support of the North Atlantic Treaty signed in Washington, D.C., on April 4, 1949. Its other official name is the French equivalent, l'Organisation du Traité de l'Atlantique du Nord (OTAN).

## O

## O

<b>Object Identifier</b>	<b>OID</b>	<p>An OID is an identifier used to name an object. Structurally an OID is a node in a hierarchically assigned namespace, formally defined using the ITU-T's ASN.1 standard. Each node in the tree is identified by numbers of the nodes starting at the root of the tree. New nodes are created by registering them under a node's registration authority. The root of the tree contains the following three "arcs":</p> <pre> * 0: ITU-T * 1: ISO * 2: joint-iso-itu-t </pre> <p><a href="http://en.wikipedia.org/wiki/OID">http://en.wikipedia.org/wiki/OID</a></p>
<b>Object Management Group</b>	<b>OMG</b>	<p>A open-membership, not-for-profit consortium that produces and maintains computer industry specifications for interoperable enterprise applications. Its web site is <a href="http://www.omg.org/">http://www.omg.org/</a>. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )</p>
<b>Object Oriented</b>	<b>OO</b>	
<b>Object Request Broker</b>	<b>ORB</b>	<p>A library that enables CORBA objects to locate and communicate with one another. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )</p>
<b>Object Type</b>		<p>During the Object-Oriented (OO) boom there was a push for all programming efforts to completely support the OO paradigm. Many of the DBMS vendors responded by providing support for User-Defined Types (UDT) and Objects.</p>
<b>Object-Based Design</b>		<p>Any design that incorporates objects. Contrast with object-oriented design and class-based design.</p>
<b>Object-based Programming Language</b>		<p>A programming language that provides the ability for the programmer to define and use objects; for example, Ada 83.</p>
<b>Object-Oriented Analysis</b>	<b>OOA</b>	<p>OOA (Object Oriented Analysis) constitutes the development of software engineering requirements and specifications for a system. These are expressed as an object model (object oriented design) which is composed of a population of interacting objects.</p>
<b>Object-Oriented Databases</b>	<b>OODBMS</b>	<p>Object-oriented databases are based on the object model, and use the same conceptual models as object-oriented analysis and design. Since OODBMSs have <a href="#">portability</a> "The ease with which a system or component can be transferred from hardware or software environment to another." (Source: IEEE Std 610.12-1990) The level of software portability of any specific product depends on two factors: the design of the product itself, and the characteristics of the source and target execution environments. Software products are rarely if ever 100% portable. Generally, the level of portability depends on the target platform. Software that is highly portable to one class of platform might be not portable to other classes of issues, only a limited number of people and outside resources support them.</p>
<b>Object-Oriented</b>		<p>Any design that incorporates objects, classes, and inheritance. Contrast with object-based design and class-based design.</p>

**Design****Object-Oriented Programming Language**

A programming language that enables programmers to define and use objects, classes, and inheritance for example, C++, Ada 95.

**Objects By Value**      **OBV**

**Office of the Under Secretary of Defense**      **OUSD**

**OGC Web Services**      **OWS**

**Online Status Check**      **OSC**

OSC is service that may be provided by the CA. A relying party sends a request to the OSC service with a certificate, the OSC service responds with a digitally signed response that includes the date and time of certificate identification, and the status of the certificate about whose validity the relying party inquired. The possible responses include “unknown” which may be the response to a query regarding an expired certificate.

**Note:** This definition is derived from the DoD Class 3 PKI – Public Key-Enabled

**Online Certificate Status Protocol**      **OCSP**

Online Certificate Status Protocol is a method for determining the revocation status of an X.509 digital certificate using means other than [CRLs](#). It is described in RFC 2560 and is on the Internet standards track.

OCSP messages are encoded in ASN.1 and usually communicated over [HTTP](#). OCSP's request/response nature leads to OCSP servers being termed as OCSP responders.

**Online Status Check Responder**      **OSCR**

OSCR is the server that responds to a relying party's OSC request.

**Only Handle Information Once**      **OHIO**

**Ontology**

standard vocabulary

**Ontology Web Language**      **OWL**

**Ontology Web Language Schema**      **OWL-S**

**Open Architecture**

An architecture that supports public access to some of its parts. An open architecture is the design of an open system. It also refers to a set of design patterns and principles by which open systems are

developed. An architecture that employs open standards for key interfaces within a system.

**Open Database Connectivity**      **ODBC**

**Open Geospatial Consortium**      **OGC**

Open Geospatial Consortium, Inc. Data posted by authoritative sources and visible, available, and usable to accelerate decision making. (Source: <http://www.opengeospatial.org/> )

**Open Source**

Generically, "open source" refers to a program in which the source code is available to the general public for use and/or modification from its original design free of charge. Open-source code is typically created as a collaborative effort in which programmers improve upon the code and share the changes within the community. Open source sprouted in the technological community as a response to proprietary software owned by corporations.

**Open Source Software**      **OSS**

(References: Scott Hissam, Charles B. Weinstock, Daniel Plakosh, Jayatirtha Asundi Perspectives on Open Source Software. November 2001. Technical Report CMU/SEI-2001-TR-019.) "The term open source software at the most basic level simply means software for which the source code is open and available. Open and available is meant to convey two concepts: Open-The source code for the software can be read (seen) and written (modified). Further, this term is meant to promote the creation and distribution of derivative works of the software. Available-The source code can be acquired either free of charge or for a nominal fee (e.g., media and shipping charges or online connection charges)."

**Open Standard**

Open standards are publicly available specifications for achieving a specific task. By allowing anyone to obtain and implement the standard, they can increase compatibility between various hardware and software components, since anyone with the necessary technical know-how and resources can build products that work together with those of the other vendors that base their designs on the standard (although patent holders may impose "reasonable and non-discriminatory" royalty fees and other licensing terms on implementers of the standard). [http://en.wikipedia.org/wiki/Open\\_standard](http://en.wikipedia.org/wiki/Open_standard)

**Note:** NESI restricts the use of the term "standard" to technologies approved by formalized committees that are open to participation by all interested parties and operate on a consensus basis.

**Open System**

An open system is a collection of interacting software, hardware, and human components designed to satisfy stated needs, with interface specifications of its components that are fully defined, available to the public, and maintained according to group consensus. In the collection, the implementations of the components conform to the interface specifications. (SEI)

**Open Systems Interconnect**      **OSI**

**Open Systems Joint Task Force**      **OSJTF**

**Open-Systems Approach**

An integrated business and technical strategy that employs a modular design and, where appropriate, defines key interfaces using widely supported, consensus-based standards that are published and maintained by a recognized industry-standards organization.

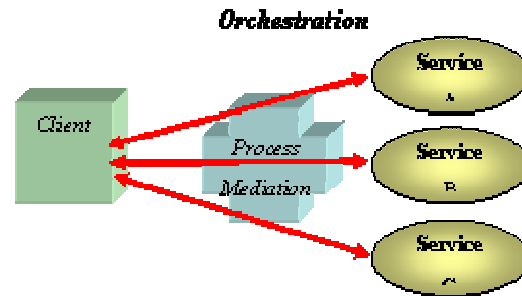
**Operational Level Agreements**      **OLA**

**Operational Views**      **OV**

**Oracle Technology Network**      **OTN**

**Orchestration**

When a client request spawns a chain of events or service requests that rely on a central coordinator, Orchestration is employed. BPEL is an example of a business process management workflow language that implements orchestration.



**Note:** See [Mediation](#).

**Organization for the Advancement of Structured Information Standards**      **OASIS**

A nonprofit, international consortium that promotes the adoption of product-independent standards for information formats such as SGML, XML, and HTML. Its web site is <http://www.oasis-open.org/> . The DTD repository it sponsors is at <http://www.XML.org> . (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**OS File Systems**

A file system that stores and retrieves data, acting as a data tier. Advocates cite performance and simplicity, but the loss of DBMS-inherent capabilities such as ad-hoc queries and the ability to upgrade faster machines is a deterrent. File-system-based data tiers often result in proprietary solutions that are difficult to maintain and port.

# P

## P

### Page Orientation

This term describes the way text appears on a printed page. There are two ways a page can be oriented: portrait and landscape. [http://web.mit.edu/abiword\\_v2.0.10/Tutorials/klw/glossary.html](http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html)

### Parser

A module that reads in XML data from an input source and breaks it into chunks so that your program can work with it. A non-validating parser ensures that the XML data is well-formed but does not verify that it is valid. See also validating parser. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html>)

### Performance Requirement

A requirement that imposes conditions on a functional requirement; for example, a requirement that specifies a minimum speed, accuracy, or memory usage with which a given function must be performed. (Source: IEEE Std 610.12-1990)

### Persistent Information State

Data stored in a structured representation by a schema or in a persistent data object.

### Personal Digital Assistant

### Personal Web Server

A web server program for PC users who want to share web pages and other files from their hard drive. It is a scaled-down version of Microsoft's more robust web server, Internet Information Server (IIS). PWS can be used to establish a full-time Internet connection to serve web pages for a web site with limited traffic. It can also be used to serve a site offline or from a "staging" site before putting it on a main web site that is exposed to more traffic.

### Personalization

The ability for portal members to subscribe to specific types of content and services. Users can customize the look and feel of their environment.

### Physical Model

Translates the conceptual model to a particular RDBMS implementation.

### Point-to-Point Messaging System

A messaging system built on the concept of message queues. Each message is addressed to a specific recipient. The client can extract messages from the queues established to hold their messages. These messages are normally persistent. The client can retrieve messages at any time, similar to email. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html>)

### Policy

A collection of policy alternatives.

### Policy Assertion

Represents a domain-specific individual requirement, capability, other property, or a behavior.

### Pop-Up Window

A window that suddenly appears (pops up) when you select an option with a mouse or press a special key. Usually, the pop-up window contains a menu of commands and stays on the screen only until you select an option. Also, a type of window that appears over the browser window of a web site when visited by a user. Pop-up windows are used extensively in advertising on the web, though advertising is not the only application for pop-up windows. Turn these off when using UNCG / DCL online courses. A special kind of pop-up window is a context menu, which appears just below the item you selected, as if you had pulled it down. (Source: <http://web.uncg.edu/dcl/ campus/access/glossary.asp>)

### Portability

The ease with which a system or component can be transferred from hardware or software environment to another. (Source: IEEE Std 610.12-1990) The level of software portability of any specific product depends on the design of the product itself, and the characteristics of the source and target execution environments. Software is rarely if ever 100% portable. Generally, the level of portability depends on the target platform. Software is rarely if ever 100% portable.

highly portable to one class of platform might be not portable to other classes.

[illegible]

<b>Producer</b>		A web service conforming to the WSRP specification. (Source: <a href="http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf">http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf</a> )
<b>Program Assessment Rating Tool</b>	<b>PART</b>	
<b>Program Change Proposals</b>	<b>PCP</b>	
<b>Program Executive Office</b>	<b>PEO</b>	
<b>Program of Record</b>	<b>POR</b>	
<b>Proprietary Software</b>		Proprietary software is software for which an individual or company holds the exclusive copyright, and license rights deny others access to the software's source code and the right to copy, modify, and study it. (Source: <a href="http://en.wikipedia.org/wiki/Proprietary_software">http://en.wikipedia.org/wiki/Proprietary_software</a> )
<b>Proprietary Standard</b>		A standard that is exclusively owned by an individual or organization, the use of which generally would require a license and/or fee.
<b>Protocol</b>		In object-oriented programming, a protocol is what or how unrelated objects use to communicate with each other. These are definitions of methods and values which the objects agree upon in order to cooperate.
<b>Proxy Pattern</b>		Provides a surrogate or placeholder for another object to control access to it.
<b>Public Domain</b>		The term "public domain" describes publications, software, and other resources which are not protected by copyright or patents.
<b>Public Key</b>	<b>PK</b>	Public-key cryptography is a form of cryptography which generally allows users to communicate securely without having prior access to a shared secret key, by using a pair of cryptographic keys, designated as public and private keys, which are related mathematically. <a href="http://en.wikipedia.org/wiki/Public_key">http://en.wikipedia.org/wiki/Public_key</a>
<b>Public Key Certificate</b>		Used in client-certificate authentication to enable the server, and optionally the client, to authenticate a client. A public key certificate is the digital equivalent of a passport. It is issued by a trusted organization, called a certification authority, and provides identification for the bearer. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Public-Key Cryptography</b>		Public-key cryptography is a form of cryptography which generally allows users to communicate securely without having prior access to a shared secret key, by using a pair of cryptographic keys, designated as public and private keys, which are related mathematically.  The term asymmetric key cryptography is a synonym for public key cryptography.  In public key cryptography, the private key is generally kept secret, while the public key may be widely distributed. In a sense, one key "locks" a lock; while the other is required to unlock it. It should not be possible to determine the private key of a pair given the public key.  There are many forms of public-key cryptography, including: <ul style="list-style-type: none"> <li>• public key encryption — keeping a message secret from anyone that does not possess a specific private key</li> <li>• public key digital signature — allowing anyone to verify that a message was created with a specific private key</li> </ul>



key.

- key agreement — generally, allowing two parties that may not initially share a secret key to a

[http://en.wikipedia.org/wiki/Private\\_key](http://en.wikipedia.org/wiki/Private_key)

## Public Key Enable

### PKE

Applications that use or are required to use public key cryptography must be enabled with functionality necessary to take advantage of the security services available.

DoD PKI 1.2

PKE is one or more of the following, depending on the specific requirements of the application for security such as authentication, confidentiality, data integrity, and non-repudiation.

- Replacing existing or creating new user authentication system using personal digital certificates or other technologies such as username/password or IP filtering
- Implementing public key technology to digitally sign, in a legally enforceable manner, transactions and documents
- Using public key technology, generally in conjunction with standard symmetric encryption to encrypt data at rest and/or in transit

## Public Key Infrastructure

### PKI

A public key infrastructure (PKI) is an arrangement which provides for third-party vetting of, and vouching for, identities. It also allows binding of public keys to users. This is usually carried by software at a central location together with other coordinated software at distributed locations. The public keys are typically in certificates. [http://en.wikipedia.org/wiki/Public\\_key\\_infrastructure](http://en.wikipedia.org/wiki/Public_key_infrastructure)

## Publish/Subscribe Messaging System

A messaging system in which clients address messages to a specific node in a content hierarchy, called a publisher. Publishers and subscribers are generally anonymous and can dynamically publish or subscribe to the content. The system takes care of distributing the messages arriving from a node's multiple publishers to its multiple subscribers. Messages are generally not persistent and will only be received by subscribers who are listening at the time the message is sent. A special case known as a "durable subscription" allows subscribers to receive messages sent while they are not active. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

## Q

### Quality of Service

### QoS

## Q

Data timeliness, accuracy, completeness, integrity, and ease of use. Refers to the probability of the network meeting a given traffic contract. In many cases is used informally to refer to the probability of a packet passing between two points in the network.

(Source:

[http://en.wikipedia.org/wiki/Quality\\_of\\_service](http://en.wikipedia.org/wiki/Quality_of_service)) -

OR- A defined level of performance that adapts to the environment in which it is operating. QoS may be requested by the user of the information. The level of QoS provided is based on the request, the available capabilities of the provider, and the priority of the user.

# R

## R

### Radio Buttons

A radio button selection box emulates the buttons on a car radio. Only one can be selected at a time. The act of selecting a button, deselects the others.

### Random Number Generator RNG

Random number generators are used in symmetric encryption for generating the session keys. Applications using symmetric encryption will use random number generator for creating the symmetric encryption keys.

### Real-Time

An operation within a larger dynamic system is called a real-time operation if the combined reaction- and operation-time of a task is shorter than the maximum delay that is allowed, in view of circumstances outside the operation. The task must also occur before the system to be controlled becomes unstable. A real-time operation is not necessarily fast, as slow systems can allow slow real-time operations. This applies for all types of dynamically changing systems. The polar opposite of a real-time operation is a batch job with interactive timesharing falling somewhere in-between the two extremes. (Source: [http://en.wikipedia.org/wiki/Real\\_time](http://en.wikipedia.org/wiki/Real_time) )

### Real-Time (Tracks)

(1) Real-time tracks are generated by sensors whose delivery latencies are sufficiently small to use in anti-air warfare (AAW). They form composite tracks for situational awareness and are of sufficient quality to engage and fire on the target. "Quality" is a weapon-dependent term. The key issue is the latency of the arrival and subsequent usage of the track data. Periodicity is also a component of track quality. (2) Pertaining to a system or mode of operation in which computation is performed during the actual time that an external process occurs, in order that the computation results can be used to control, monitor, or respond in a timely manner to the external process.

### Real-Time Operation System RTOS

An operating system that has been developed for real-time applications. Typically used for embedded applications. This type of operating system does not necessarily have high throughput - the specialized scheduling algorithm and a high clock-interrupt rate can both interfere with throughput. (Source: <http://en.wikipedia.org/wiki/RTOS> )

### Real-Time System

A system in which the correctness of system behavior depends on both the logical correctness of the computation and the time at which the result is produced. For a real-time system, the system fails if its timing constraints are not met. "Real time" is not necessarily synonymous with "fast." The latency of the response might not be an issue, and it could be on the order of seconds or minutes. But the bounded latency that is sufficient to solve the problem at hand is guaranteed by the system. "Bounded" means that the response is neither too early nor too late. In real-time systems, early can be as

bad as late.

### **Refactoring**

Refactoring is often used to describe modifying source code without changing its external behavior, and is sometimes informally referred to as "cleaning it up". Refactoring is often practiced as part of the software development cycle: developers alternate between adding new tests and functionality and refactoring the code to improve its internal consistency and clarity. Testing ensures that refactoring does not change the behavior of the code.

### **Reference Data Set**

This data product combines into one package reference data tables and related meta-data information for reuse in DoD systems and COE database segments. Examples are Country Code, US State Code, Purchase Order Type Code, Security Classification Code. A Reference Data Set is contained in a simple ASCII delimited file ready to use within a data server or other application. Identified within each package is the name of a functional steward or the authoritative source for use.

**For Example:**  
**Country Code**  
**US State Code**  
**Purchase Order Type Code**  
**Security Classification Code**

Data sets are used across the DoD as a uniform representation of data. Each reference data set is associated with the stewardship of a functional proponent and approved for use in DoD systems. The data sets found here are designed for use under the COE but may be downloaded into the current system. DoD's COE and non-COE developers are encouraged to use these sets IMMEDIATELY to support data interoperability and integration, and promote cost savings <http://diides.ncr.disa.mil/rdsgal/user/index.cfm>

### **Reference Model**

A structure that allows the modules and interfaces of a system to be described in a consistent manner.

### **Referential Integrity**

A feature provided by RDBMSs that prevents users or applications from entering inconsistent data. Most RDBMSs have various referential integrity rules that you can apply when you create a relationship between two tables.

### **registered namespace**

A namespace that has been registered and approved with a [namespace](#) registration services. For the DoD, use the [DoD Metadata Registry](#).

### **Registry**

#### **Relational Database**

#### **RDB**

A collection of data items organized as a set of formally-described tables from which data can be accessed or reassembled in many different ways without having to reorganize the database tables.

#### **Relational Database Management**

#### **RDBMS**

A database management system (DBMS) that is based on the relational model or that presents the data to the user as relations. A collection of tables, each table consisting of a set of rows and columns, can satisfy this property. RDBMSs also provide relational

<b>System</b>		operators to manipulate the data in tabular form. (Source: <a href="http://en.wikipedia.org/wiki/RDBMS">http://en.wikipedia.org/wiki/RDBMS</a> )
<b>Relative Font Size</b>		Fonts that display according to the size of the surrounding text. Some designers call them scalable fonts. Instead of displaying a fixed pixel size, a relative font size displays as a percentage of the surrounding elements. <a href="http://www.netmechanic.com/news/vol5/design_no13.htm">http://www.netmechanic.com/news/vol5/design_no13.htm</a>
<b>Remote Method Invocation</b>	<b>RMI</b>	A technology that allows an object running in one Java virtual machine to invoke methods on an object running in a different Java virtual machine. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Remote Method Invocation / Internet Inter-Orb Protocol</b>	<b>RMI/IIOP</b>	A version of RMI implemented to use the CORBA IIOP protocol. RMI over IIOP provides interoperability with CORBA objects implemented in any language if all the remote interfaces are originally defined as RMI interfaces. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Remote Track</b>		A track established by a remote unit, or group of units, and supplied to the local platform.
<b>Remove Procedure Call</b>	<b>RPC</b>	An alternative to sockets that abstracts the communication interface to the level of a procedure call. The programmer has the illusion of calling a local procedure, but in fact the arguments of the call are packaged and sent to the remove target of the cell. RPC systems encode arguments and return values using an external data representation such as XDR. RPC does not translate well into distributed object systems, which require communication between program-level objects in different address spaces. To match the semantics of object invocation, distributed object systems require RMI. A local surrogate (stub) object manages the invocation on a remote object.
<b>Replication</b>		Replication is the process of copying data from one DBMS to another DBMS. As data are added to or modified in a database, replication adds or modifies the data in another, physically separated, database.
<b>Repository</b>		
<b>Representational State Transfer</b>	<b>REST</b>	
<b>Request For Comment</b>	<b>RFC</b>	
<b>Request For Information (RFI)</b>		Any specific time-sensitive ad-hoc requirement for intelligence information or products. RFIs support ongoing crises or operations not necessarily related to standing requirements or scheduled intelligence production. A RFI can be initiated to respond to operation requirements and will be validated in accordance with the theater command's procedures.

<b>Request-Response Messaging System</b>		A system of messaging that includes blocking until a response is received. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Requirement</b>		A condition or capability to which a system must conform. Requirements may be derived directly from user needs, or stated in a contract, standard, specification, or other formally imposed document. A desired feature, property, or behavior of a system. A capability that the system must deliver.
<b>Resource Adapter</b>		A system-level software driver that a Java application uses to connect to an Enterprise Information System (EIS).
<b>Resource Adaptor Archive</b>	<b>RAR</b>	A J2EE component that implements the J2EE Connector architecture for a specific Enterprise Information System (EIS). J2EE applications communicate with an EIS through the resource adapter. You can deploy RARs on any J2EE server. A RAR file may be independent or contained in an EAR file.
<b>Resource Definition Framework</b>	<b>RDF</b>	
<b>Resource Definition Framework Schema</b>	<b>RDFS</b>	
<b>Reusable Applications Integration and Development Standards</b>	<b>RAPIDS</b>	Established with the objective of developing a common set of software standards and implementing a set of processes designed to build portable and reusable software. The intent was to reduce both the time and cost of developing software for Navy C4I systems. This <a href="#">NCW</a> effort was merged with the Air Force's C2ERA to form NESI.
<b>Rivest, Shamir, and Adleman</b>	<b>RSA</b>	In cryptography, RSA is an algorithm for public key encryption. It was the first algorithm known to be suitable for signing as well as encryption, and one of the first great advances in public key cryptography. RSA is still widely used in electronic commerce protocols, and is believed to be secure given sufficiently long keys.  <a href="http://en.wikipedia.org/wiki/RSA">http://en.wikipedia.org/wiki/RSA</a>
<b>Role Mapping</b>		The process of associating groups, principals, or both, recognized by the container with security roles specified in the deployment descriptor. Security roles must be mapped by the deployer before a component is installed in the server. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Role-Based Access Control</b>	<b>RBAC</b>	An approach to restricting system access to authorized users. It is a newer and alternative approach to discretionary access control and mandatory access control. It assigns permissions to specific operations with meaning in the organization, rather than to low-level data objects. (Source: <a href="http://en.wikipedia.org/wiki/RBAC">http://en.wikipedia.org/wiki/RBAC</a> )

<b>Rollback</b>	The point in a transaction when all updates to any resources involved in the transaction are reversed. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Rollover</b>	The effect produced by changing the appearance of a graphical element when the mouse pointer moves over it. <a href="http://www.google.com/search?hl=en&amp;lr=&amp;rls=GGLD,GGLD:2005-19,GGLD:en&amp;oi=defmore&amp;q=define:Rollover">http://www.google.com/search?hl=en&amp;lr=&amp;rls=GGLD,GGLD:2005-19,GGLD:en&amp;oi=defmore&amp;q=define:Rollover</a>
<b>Rules of Engagement</b>	<b>ROE</b>
<b>Sans Serif Font</b>	A sans serif font is a font that has no serifs. Examples are Arial, Century Gothic, and Helvetica. <a href="http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html">http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html</a>

# S

## S

### Schema

#### Sea Basing

Projecting Joint Operational Independence through the extended reach of networked weapons and capabilities. Capabilities include: (1) enhanced afloat positioning of joint assets; (2) offensive and defensive power projection; (3) command and control; (4) integrated joint logistics; and (5) accelerated deployment and employment timelines.

#### Sea Shield

Takes naval defense beyond unit- and task-force defense to provide the nation with sea-based theater strategic defense. Capabilities include: (1) homeland defense; (2) sea and littoral superiority; (3) theater missile defense; and (4) force entry enabling.

#### Sea Strike

Describes the capabilities of naval forces to project decisive and persistent offensive power anywhere in the world. Capabilities include: (1) Persistent intelligence, surveillance, and reconnaissance; (2) time-sensitive strikes; (3) electronic warfare/ and information operations; (4) ship-to-objective maneuvers; and (5) precision strikes.

#### Secret Internet Protocol Router Network

##### SIPRNET

The SIPRNet (Secret Internet Protocol Router Network) is a system of interconnected computer networks used by the U.S. Department of Defense to transmit classified information (up to and including information classified SECRET//NOFORN) by packet switching over the TCP/IP protocols in a completely secure environment. It also provides services such as hypertext documents and electronic mail. In other words, SIPRNet is the DoD's classified version of the civilian Internet and it (and its TOP SECRET//SCI counterpart known as JWICS) are revolutionizing the way classified information is disseminated to consumers.

<http://en.wikipedia.org/wiki/SIPRNET>

#### Secret Key

The asymmetric key cryptography approach generates two keys, a public key and a private key. The [private key](#) is often referred to as the secret key.

#### Secure Hash Algorithm

##### SHA

The SHA (Secure Hash Algorithm) family is a set of related cryptographic hash functions. In cryptography, a cryptographic hash function is a hash function with certain additional security properties to make it suitable for use as a primitive in various information security applications, such as authentication and message integrity. A hash function takes a long string (or message) of any length as input and produces a fixed-length string as output, sometimes termed a message digest or a digital fingerprint.

[http://en.wikipedia.org/wiki/SHA#SHA-0\\_and\\_SHA-1](http://en.wikipedia.org/wiki/SHA#SHA-0_and_SHA-1)

#### Secure Hash Algorithm 1

##### SHA-1

The most commonly used function in the family, SHA-1, is employed in a large variety of popular applications and protocols, including TLS, SSL, PGP, SSH, S/MIME, and IPsec.

<http://en.wikipedia.org/wiki/SHA>

#### Secure Socket Layer

##### SSL


A technology that allows web browsers and web servers to communicate over a secured connection using the protocol runs above TCP/IP and below application protocols. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

#### Security Assertion

##### SAML

An XML standard for exchanging authentication and authorization data between security domains; used between an identity provider and a service provider. SAML is a product of the OASIS Security Services.



<b>Markup Language</b>	Technical Committee. (Source: <a href="http://en.wikipedia.org/wiki/SAML">http://en.wikipedia.org/wiki/SAML</a> )
<b>Security Context</b>	An abstract concept that refers to an established authentication state and negotiated key(s) that may have additional security-related properties.
<b>Security Role</b>	An abstract logical grouping of users that is defined by the application assembler. When an application is deployed, the roles are mapped to security identities, such as principals or groups, in the operational environment. In the J2EE server authentication service, a role is an abstract name for permission to access a particular set of resources. A role can be compared to a key that can open a lock. Many people might have a copy of the key; the lock doesn't care who you are, only that you have the right key. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Security Token</b>	Represents a collection of one or more claims.
<b>Security Token Service</b>	A Web service that issues security tokens (see [WS-Security]). That is, it makes assertions based on trust that it trusts, to whoever trusts it (or to specific recipients). To communicate trust, a service requires a signature such as a signature to prove knowledge of a security token or set of security token. A service itself can generate tokens or it can rely on a separate STS to issue a security token with its own trust statements (that for some security token formats this can just be a re-issuance or co-signature). This forms the basis of trust brokering.
<b>Selection Boxes</b>	A selection box provides a limited range of answers for the user to choose from. There are three basic types of selection boxes: radio buttons, check boxes and drop down lists.
<b>Semantics</b>	The implied meaning of data, the study of words and their meanings.
<b>Semi-Structured Data</b>	Partial metadata
<b>Separation of Implementation and Interface</b>	Services expose mission capabilities through well-defined interfaces and provide reliable and scalable components
<b>Serialization</b>	<p>Serialization is the process of writing a complex object into a serial stream of data. When the data is successfully transferred, the data can be <a href="#">deserialized</a> back into a complex object.</p> <p><b>Note:</b> The process of transferring data using serialization and <a href="#">deserialization</a> is called <a href="#">marshalling</a>.</p>
<b>Serif Font</b>	<p>A serif is a feature of the letters in a given typeset. They appear at the end of lines within the letters. For example, the letter T in Times New Roman - at the end of each horizontal line is a tick that points down (that is the serif). Serif fonts include Times New Roman, Bookman Oldstyle, and Courier.</p>  <p><a href="http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html">http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html</a></p>
<b>Server</b>	A computer software application that carries out some task (i.e. provides a service) on behalf of yet another piece of software called a <a href="#">client</a> .

<b>Service</b>		A service is any function that has a clearly defined interface accessed through well-defined public points.
<b>Service Access Point</b>	<b>SAP</b>	SAP provides all of the information necessary for a user to access and consume a service. Includes and physical location of the service on the net.
<b>Service Availability</b>		The name and location of the organization responsible for the day-to-day operational management service. Include operational point of contact information, trouble-reporting procedures, and applicable telephone numbers, email addresses, etc.
<b>Service Consumer</b>		The person, organization, or automated asset that makes use of a service.
<b>Service Definition Framework</b>	<b>SDF</b>	SDF provides service users, customers, developers, providers, and managers with a common framework reference. Its structure and methodology enable you to fully define the Service Access Points (SAP) for a service.
<b>Service Description</b>		A short descriptive name of the service. Include a human-readable description and the XML Qualified Name (QName) for the service.
<b>Service Level Agreements</b>	<b>SLA</b>	A contractual vehicle between a service provider and a service consumer. It specifies performance requirements, measures of effectiveness, reporting, cost, and recourse. It usually defines repair turn times for users.
<b>Service Performance Specification</b>		The percentage of time that the service shall be available over a specified period of time (typically Agreed-upon maintenance or other scheduled downtime does not count against total availability.
<b>Service Provider</b>		The person, organization, or automated asset that implements and operates a service.
<b>Service Registry</b>		Provides descriptive information about a service, enabling the lookup and discovery of services.
<b>Service Response Time</b>		The planned performance levels of the service (e.g., throughput, capacity, or other applicable measures) expressed as a function of work units processed per unit of time.
<b>Service-Oriented Architecture</b>	<b>SOA</b>	Services enable access to data and application functionality through public interfaces exposed to the enterprise
<b>Servlet</b>		A Java program that extends the functionality of a web server, generating dynamic content and interacting with web applications using a request-response paradigm. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Servlet Container</b>		A container that provides the network services over which requests and responses are sent, decodes, and formats responses. All servlet containers must support HTTP as a protocol for requests and responses. It can also support additional request-response protocols, such as HTTPS. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Servlet Context</b>		An object that contains a servlet's view of the web application within which the servlet is running. In this context, a servlet can log events, obtain URL references to resources, and set and store attributes that other servlets in the context can use. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Servlet Session</b>		An object used by a servlet to track a user's interaction with a web application across multiple HTTP requests. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )

<b>Session</b>		An interaction between system entities of finite duration, often involving a user, typified by the maintenance of some state of the interaction for the duration of the interaction. (Source: <a href="http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf">http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf</a> )
<b>Session Bean</b>		An enterprise bean that is created by a client and that usually exists only for the duration of a single server session. A session bean performs operations, such as calculations or database access, for the duration of the session. Although a session bean can be transactional, it is not recoverable should a system crash occur. Session bean objects can be stateless or can maintain conversational state across methods and transactions. If a stateful session bean maintains state, then the EJB container manages this state if the object must be removed from the container. However, the session bean object itself must manage its own persistent data. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Session Initiation Protocol for Instant Messaging</b>	<b>SIMPLE</b>	
<b>Session Key</b>		Synonymous with the <a href="#">secret</a> or <a href="#">private key</a> .
<b>Shared Cross-Domain Resource</b>	<b>SCDR</b>	
<b>Shareware</b>		Shareware is software whose license terms permit free redistribution, but also require that anyone who continues to use a copy must pay a license fee. (Source: <a href="http://www.gnu.org/philosophy/categories">http://www.gnu.org/philosophy/categories</a> )
<b>Signed Security Token</b>		A security token that is asserted and cryptographically signed by a specific authority (e.g. an X.509 certificate or a Kerberos ticket).
<b>Simple Initiation Protocol</b>	<b>SIP</b>	The SIP standard concerns simple call placement and is designed to be easily expandable.
<b>Simple Interfaces</b>		A small set thereof universally available to all providers and consumers
<b>Simple Mail Transfer Protocol</b>	<b>SMTP</b>	
<b>Simple Network Management Protocol</b>	<b>SNMP</b>	A design style for building flexible, adaptable, distributed-computing environments. SOA is the umbrella structure in which the components of a computer, computer system, or system of systems are integrated and their inter-component functions are defined as services. Service-oriented design is fundamentally a design style for sharing and reusing functionality across diverse applications.
<b>Simple Object Access Protocol</b>	<b>SOAP</b>	SOAP is a lightweight XML-based messaging protocol used to encode the information in web-service request-and-response messages before sending them over a network. SOAP messages are independent of any operating system or protocol and may be transported using a variety of Internet protocols, including HTTP, MIME, and HTTP.
<b>Simple Structured Data</b>		Simple Structured Data has an uncomplicated data structure. All requisite Metadata is provided and only simple data types only are used (e.g., integers, long integers, strings, and simple lists).
<b>Simple Unstructured</b>		Simple Unstructured Data has uncomplicated data structure but not all requisite Metadata is provided.

**Data****Single Integrated Air Picture****SIAP**

The SIAP is the product of fused, common, continuous, unambiguous tracks of all airborne objects in the surveillance area. Each object within the SIAP has one, and only one, track number and set of associated characteristics. The SIAP is developed from near-real time and real time data, and is scalable and flexible to support situation awareness, battle management, and target engagements. JTAMDO Battle Management Concept.

**Single Sign-On****SSO****Single Touch Point**

The portal becomes the delivery mechanism for all business information services.

**Smart Pull**

Applications that encourage discovery; users can pull data directly from the net or use value-added services.

**Socket**

A socket is a form of inter-process communication used to form one end of a bi-directional communication link between two applications, likely over a computer network but potentially also on the same machine. There are two types of sockets: Internet sockets and local sockets. <http://en.wikipedia.org/wiki/Socket>

**Internet Sockets**

In RFC documents relating to TCP or UDP, a socket on a certain host is defined as the combination of an IP address, a protocol, and a port number.

The BSD operating system introduced network sockets in 1983: see the Berkeley sockets API. Each socket gets bound to a given port, which lets the transport layer protocol (typically UDP or TCP) identify the application to send the data to. <http://en.wikipedia.org/wiki/Socket>

**Local Sockets**

Another type of socket is used by POSIX compliant systems, and are called Unix domain sockets or local sockets (the correct standard POSIX term is POSIX Local IPC Sockets). Their primary function is to provide for inter-process communication on the same host instead of over a network. These connections are local to the computer to itself, not actually a connection transmitted over a physical network. <http://en.wikipedia.org/wiki/Socket>

**Soft Real-Time**

In a soft real-time system, the value of an operation declines steadily after the deadline expires.

**Software Developer's Kits****SDK**

A set of development tools that allows a software engineer to create applications for a certain software package, software framework, hardware platform, computer system, operating system, and so on. It can be as simple as an application programming interface in the form of some files to interface to a particular programming language, or as complex as sophisticated hardware to communicate with a certain embedded system. Common tools include debugging aids and other utilities. SDKs frequently include sample code, technical notes, and other supporting documentation to clarify points from the primary reference material. (Source: <http://en.wikipedia.org/wiki/SDK> )

**Software License**

A software license sets out the terms under which the software may be used, and serves as an agreement between the producer and the users of the program. A set of terms and conditions which the owner of the copyright on a piece of software conveys to users of the software. Licenses take many different forms.

**Software Patent**

Patents grant an inventor the right to exclude others from producing or using the inventor's discovery or invention for a limited period of time. In order to be patented an invention must be novel, useful, and not of an obvious nature (see §§ 101 - 103 of Title 35). The Federal agency charged with administering patents is the Patent and Trademark Office. See §§ 1-26 of Title 35. Its regulations, pertaining to Patents, are found in Parts 2 - 6 of Title 37 of the Code of Federal Regulations. Each patent application for an alleged invention is reviewed by an examiner to determine if it is entitled to a patent. See § 1.104 of Part 1 of Title 37 (C.F.R.). While historically a model was required as part of a patent application, in most cases today a detailed specification is necessary. See §§ 112 - 114 of Title 35. Software may be patented. There are

currently more than 4,000 software patents in effect.

**Software  
Trouble Report**      **STR**

**Software Unit**

(1) A separately testable element specified in the design or a computer software component. (2) A separable part of a computer program. (3) A software component that is not subdivided into other components. (4) (IEEE Std 1008-1987 [10]) Note: The terms "module," "component," and "unit" are used interchangeably or as sub-elements of one another in different ways depending upon the context. The relationship of these terms is not yet standardized. In common usage, the term generally denotes the compilable software component, in the context of (3) from the IEEE definition. That is, it can be compiled and it does not contain any other software components. See also test unit. (Source: IEEE Std 610.1)

**Space and Naval  
Warfare  
Systems  
Command**      **SPAWAR**

**Stakeholder**

An enterprise, organization, or individual having an interest or a stake in the outcome of the engineering system. (Source: EIA-632, Annex A)

**Standard**

A document that establishes engineering and technical requirements for products, processes, procedures, practices, and methods that have been decreed by authority or adopted by consensus. (Source: EIA-632, Annex A)

**Standard Data  
Entry**

There are several standard data entry fields: input areas, selection boxes (i.e. radio buttons, check boxes, drop down lists), and text areas.

**Standard  
Generalized  
Markup  
Language**

**SGML**

The parent of both HTML and XML. Although HTML shares SGML's propensity for embedding presentation information in the markup, XML is a standard that allows information content to be separated from the mechanisms for rendering that content. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Standard  
Toolbar**

Toolbar normally displayed directly under the Menu bar, that contains the most commonly used items. For example, in AbiWord, e.g., Create a new document, Open an existing document, Save the document, Print the document, Copy, Paste, etc. [http://web.mit.edu/abiword\\_v2.0.10/Tutorials/klw/glossary.html](http://web.mit.edu/abiword_v2.0.10/Tutorials/klw/glossary.html)

**Stateless Session  
Bean**

A session bean with no conversational state. All instances of a stateless session bean are identical. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

**Statement of  
Objectives**      **SOO**

**Statement of  
Work**      **SOW**

**Storage Area  
Network**      **SAN**

A network designed to attach computer storage devices such as disk array controllers and tape libraries to servers. (Source: <http://en.wikipedia.org/wiki/SAN> )

**Stored  
Procedure**

A unit or module of code that executes in a database and implement some bit of application logic or business rule. Often written in proprietary language such as Oracle's PL/SQL or Sybase's Transact-SQL.

**Stovepipe  
System**

A stovepipe system is a legacy system that is an assemblage of inter-related elements that are so tightly bound together that the individual elements cannot be differentiated, upgraded or refactored. The system is a collection of elements that are so tightly bound together that the individual elements cannot be differentiated, upgraded or refactored. The system is a collection of elements that are so tightly bound together that the individual elements cannot be differentiated, upgraded or refactored.

system must be maintained until it can be entirely replaced by a new system.

Examples of stovepipe systems:

- Systems for which new hardware is no longer available.
- Systems whose original source code has been lost.
- Systems that were built using old or ad hoc engineering methodologies for which support longer be found.

The term is also used to describe a system that does not interoperate with other systems, presuming that it is the only extant system.

A stovepipe system is an example of an anti-pattern legacy system and demonstrates software brittleness. ([http://en.wikipedia.org/wiki/Stovepipe\\_system](http://en.wikipedia.org/wiki/Stovepipe_system))

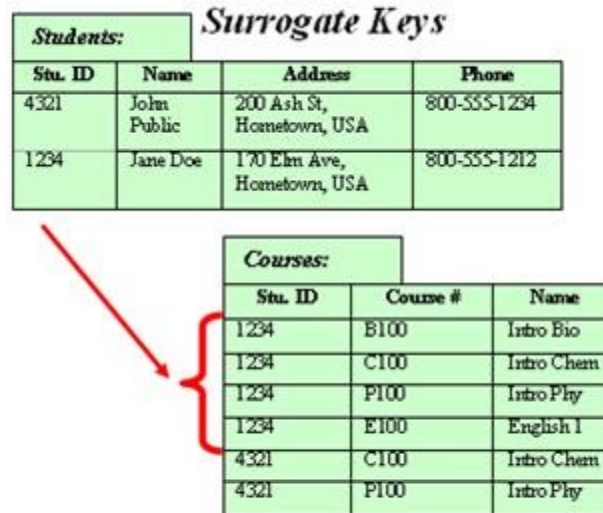
## Structure Metadata

<b>Structured Query Language</b>	<b>SQL</b>	The standardized relational database language for defining database objects and manipulating data. ( <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Structured Query Language 1992</b>	<b>SQL-92</b>	The SQL-92 and SQL:1999 standards are very detailed and specific. At the current time, no <a href="#">RDBMS</a> fully support the entire standard. Vendors that claim they are SQL-92-compliant or SQL:1999-compliant actually only compliant to a certain level. The SQL-92 standard defines the following levels, which apply to SQL:1999: (1) Notational; (2) Transitional level SQL92; (3) Intermediate level SQL92; (4) Full level SQL92. (Source: <a href="http://dbs.uni-leipzig.de/en/lokal/standards.pdf">http://dbs.uni-leipzig.de/en/lokal/standards.pdf</a> ; <a href="http://developer.mimer.com/documentation/html_82/Mimer_SQL_Reference_Manual/Intro_SQL_92.html">http://developer.mimer.com/documentation/html_82/Mimer_SQL_Reference_Manual/Intro_SQL_92.html</a> )
<b>Structured Query Language 1999</b>	<b>SQL-99</b>	See SQL-92.
<b>Structured Query Language for Java</b>	<b>SQL/J</b>	A set of standards that includes (1) specifications for embedding SQL statements in methods in the programming language and (2) specifications for calling Java static methods as SQL stored procedures or user-defined functions. An SQL checker can detect errors in static SQL statements at program development time, rather than at execution time as with a JDBC driver. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Style Sheet</b>		A specification of formatting instructions that, when applied to structured information, provides a particular rendering of that information (for example, online or printed). Different style sheets may be applied to the same piece of structured information to produce different presentations of the information. ( <a href="#">IBM Web Content Manager Glossary</a> )
<b>Subsystem</b>		A group of items that performs a set of functions within a particular end product. (Source: EIA-632-A)
<b>Supporting Source Track</b>		A composite/collaborative track, a multi-sensor correlated track, a manual track, or an INTEL-generated track that is the basis for declaring the existence of a system track.
<b>Supporting Task</b>		Specific activities that contribute to the accomplishment of a joint-mission-essential task. Supporting tasks are accomplished at the same command level or by subordinate elements of a joint force (e.g., joint force element).

functional components, etc.).

### Surrogate Key

A surrogate key is a primary key that has been explicitly created and has no relationship with the naturally occurring data found within a table.



If the student name "Jane Doe" changes, only one occurrence of the name must be changed.

See [Natural Key](#) and [Primary Key](#).

### Symmetric Key Algorithm

Encryption algorithm where the same key is used for both encrypting and decrypting a message.

### System

Two or more interrelated pieces of equipment (or sets) arranged in a package to perform an operational function or to satisfy a requirement. (Source: Defense Acquisition Glossary of Terms, Jan 2001)

### System Architecture

The composite of the design architectures for products and their life cycle processes. (Source: IEEE Std 1998)

### System Communications Architecture

SCA

### System Time

Represents the time standard used within the combat system, including the local source of Universal Coordinated Time (UTC), a system-wide monotonically increasing reference time, as well as other representations of the system-wide reference time.

### System Track

A platform-specific representation of an individual entity, identified by a unique system track number containing one or more track state vectors and uncertainties, as well as associated attributes, attributes, uncertainties, and data valid time.

### System Views

SV

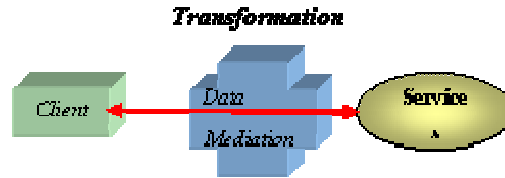
# T

## T

<b>Tactical Data, Other</b>		Data of a non-kinematic, non-sensor-processed nature including intelligence, imagery, voice, context information (e.g., commercial air and shipping lanes, political boundaries).
<b>Tactics, Techniques, and Procedures</b>	<b>TTP</b>	
<b>Task</b>		A discrete event or action, not specific to a single unit, weapon system, or individual, that enables a mission or function to be accomplished.
<b>Task, Post, Process, Use</b>	<b>TPPU</b>	
<b>Task, Process, Exploit, Disseminate</b>	<b>TPED</b>	
<b>Taxonomy</b>		
<b>Taxonomy Gallery</b>		The Taxonomy Gallery is an important component of the Metadata Registry and Clearinghouse. The Taxonomy Gallery provides its users with access to the core taxonomy for DoD. <a href="http://diides.ncr.disa.mil/taxgal/user/index.cfm">http://diides.ncr.disa.mil/taxgal/user/index.cfm</a>
<b>Technical Direction Letter</b>	<b>TDL</b>	
<b>Technical Requirements Document</b>	<b>TRD</b>	
<b>Technical Views</b>	<b>TV</b>	
<b>Technology Development Strategy</b>	<b>TDS</b>	Rationale and description of how the program will be divided into technology spirals and development increments, specific performance goals, and exit criteria for moving beyond prototype limitations. Program strategy for the total R&D program. Specific cost, schedule, performance goals, and test plan for first technology spiral development.
<b>Telnet</b>		The Telnet protocol enables terminals and terminal-oriented processes to communicate on a network running TCP/IP. (Source: <a href="http://www.sun.com/products-n-solutions/hardware/docs/html/817-6210-10/glossary.html">http://www.sun.com/products-n-solutions/hardware/docs/html/817-6210-10/glossary.html</a> )
<b>Tenet</b>		Net-centric design precept.
<b>Test and Evaluation Master Plan</b>	<b>TEMP</b>	Describes all planned testing, including measures to evaluate the performance of the system during test periods, an integrated test schedule, and resource requirements.



<b>Text Area</b>	An area where a user can enter multiple lines of free form text.
<b>Text Box</b>	An area where a user can enter a single line of free form text.
<b>Ticker</b>	Scrolling text displayed on a screen that continuously updates with new information. Examples are stock quote tickers and sport score tickers.
<b>Time-Out</b>	A period of time after which some condition becomes true if some event has not occurred. - OR- The action of so doing. For example, a session that is terminated because its state has been inactive for a specified period of time is said to "time out". (Source: <a href="http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf">http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf</a> )
<b>Track</b>	(1) A set of detections, contacts, hits, or observations, generated by the same real object in the environment. It is identified by a track number, and has intrinsic and derived attributes associated with it. (2) A series of related contacts displayed on a data display console or other display device. (3) To display or record the successive positions of a moving object.
<b>Track Kinematics</b>	A track state vector that represents the best understanding of the entity's position and movement at a defined point in time with the objective of predicting the entity's future position if it maintains a consistent direction of movement.
<b>Track Number</b>	The unique or alphanumeric identifier associated with a specific set of track data, representing a vehicular object, point, line of bearing, fix, or area of probability.
<b>Track Quality</b>	<b>TQ</b> A numerical value assigned to a track that represents the accuracy of the track position. It is computed from data related to the past tracking performance.
<b>Track State</b>	Smoothed position and velocity representation of an individual object, which minimizes the RMS errors in estimates of the closest point of approach and time of closest point of approach.
<b>Trade Secret</b>	A trade secret is any formula, pattern, device, or compilation of information used in a business that gives an advantage over competitors who do not know it or use it.
<b>Trade Mark</b>	Trademarks are generally distinctive symbols, pictures, or words that sellers use to distinguish and identify the origin of their products. Trademark status may also be granted to distinctive and unique packaging, color combinations, building designs, product styles, and overall presentations. It is possible to receive trademark status for identification that is not obviously distinct or unique, but which has developed a secondary meaning over time that identifies it with the product or seller. The owner of a trademark has exclusive right to use it on the product it was intended to identify, and often on related products. Service marks receive the same legal protection as trademarks but are meant to distinguish services rather than products. A trademark registered under the Lanham Act has nationwide protection. See § 1115 of the Act. Under the Lanham Act, a seller applies to register a trademark with the Patent and Trademark Office. The mark can already be in use or be one that will be used in the future.
<b>Transaction</b>	A set of input data that triggers execution of a specific processor job. Usually manipulates data that may need to be rolled back to the original values if any part of the transaction fails. Transactions enable multiple users to access the same data concurrently. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Transformation</b>	When a client requests data from a service in a particular format, a transformer is employed. A transformer will retrieve and reformat the data, returning it to the client.



**Note:** See [Mediation](#).

## Transformational TCM Communications MILSATCOM

### Transient Information State

Data stored in a software program, object, temporary file, table or variable.

### Transmission Control Protocol

**TCP**

One of the core protocols of the Internet protocol suite. Using TCP, programs on networked computers can create connections to one another, over which they can send data. The protocol guarantees that data sent by one endpoint will be received in the same order by the other, without any pieces missing. It also distinguishes data for different applications (such as a web server and an email server) on the same computer. (Source: [http://en.wikipedia.org/wiki/Transmission\\_Control\\_Protocol](http://en.wikipedia.org/wiki/Transmission_Control_Protocol) )

### Transmission Control Protocol/Internet Protocol

**TCP/IP**

A suite of communications protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP. TCP/IP is built into the UNIX operating system and is used by the Internet, making it the de facto standard for transmitting data over networks. Even network operating systems that have their own protocols, such as Netware, also support TCP/IP.

### Transport Infrastructure

The foundation for net-centric transformation in DoD.

### Transport Level Security

**TLS**

### Trigger

In a DBMS, a trigger is a SQL procedure that initiates (fires) an action when an event (INSERT, DELETE, or UPDATE) occurs. Since triggers are event-driven specialized procedures, the DBMS stores and manages them. A trigger cannot be called or executed; the DBMS automatically fires the trigger as a result of a data modification to the associated table. Triggers maintain the referential integrity of data by changing the data in a systematic fashion.

### Triple Data Encryption Algorithm

**TDEA**

An encryption algorithm whose key consists of three DES (Data Encryption Standard) keys, which is also referred to as a key bundle. A DES key consists of 64 binary digits ("0"s or "1"s) of which 56 bits are randomly generated and used directly by the algorithm. (The other 8 bits, which are not used by the algorithm, may be used for error detection.) Each TDEA encryption/decryption operation (as specified in ANSI X9.52) is a compound operation of DES encryption and decryption operations. Let EK(I) and DK(I) represent the DES encryption and decryption of I using DES key K respectively.

[http://www.atis.org/tg2k/triple\\_data\\_encryption\\_algorithm.html](http://www.atis.org/tg2k/triple_data_encryption_algorithm.html)

### Trust

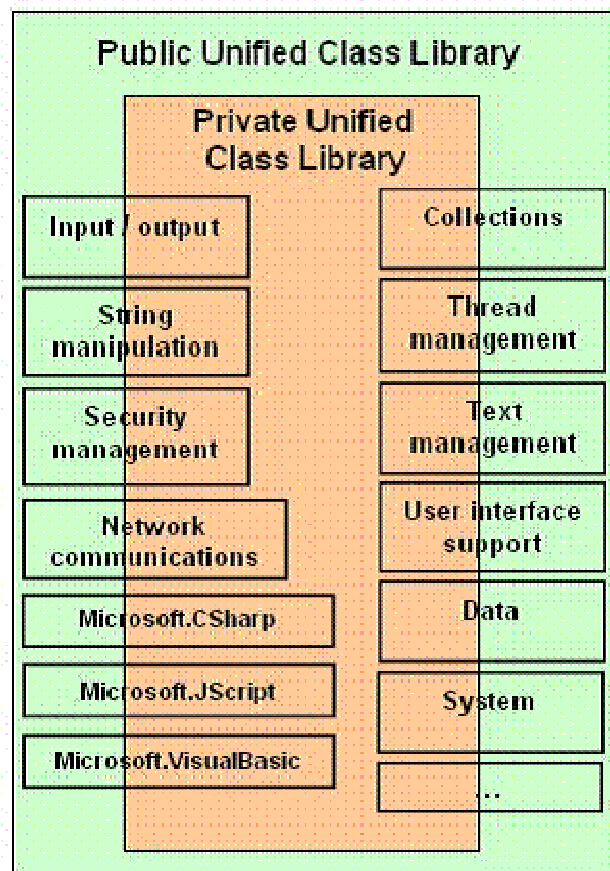
The characteristic that one entity is willing to rely upon a second entity to execute a set of actions and/or to make set of assertions about a set of subjects and/or scopes.

<b>Trust Point</b>		A trust point is a <a href="#">Certificate Authority (CA)</a> that is the root of all trust for all <a href="#">CAs</a> in a <a href="#">CA</a> hierarchy.
<b>Trust Domain</b>		An administered security space in which the source and target of a request can determine and agree whether particular sets of credentials from a source satisfy the relevant security policies of the target. The target may defer the trust decision to a third party (if this has been established as part of the agreement) thus including the trusted third party in the Trust Domain.
<b>Trusted Path</b>		A communications path where: (1) There is reasonable confidence that there has not been any malicious alteration of the information; (2) The data are timely, meaning they originated within a small preceding period of time.
<b>Trusted Third Party</b>	<b>TTP</b>	<p>A security authority trusted by communicating entities with respect to specific security-related activities (e.g., for the purpose of authentication).</p> <p><a href="http://www.atis.org/tg2k/trusted_third-party.html">http://www.atis.org/tg2k/trusted_third-party.html</a></p>
<b>Tunneling</b>		Transporting IPv6 traffic through IPv4 networks by encapsulating IPv6 packet in IPv4 and vice-versa.
<b>Typeface</b>		<p>In typography, a coordinated set of character designs, which usually comprises an alphabet of letters, a set of numerals and a set of punctuation marks. There are also typefaces of Ideograms and symbols (e.g. mathematical or map making).</p> <p>In its widest sense a typeface could be said to be a set of design rules (i.e. a style, look or feel) in which any character can be conceived. This allows for addition of new characters to existing typefaces (e.g. the introduction of the euro sign).</p> <p>The art of designing typefaces is called type design, being the occupation of a type designer  <a href="http://en.wikipedia.org/wiki/Typeface">http://en.wikipedia.org/wiki/Typeface</a></p>

U

U

<b>Unassociated Measurement Report</b>	<b>UMR</b>	(1) A sensor measurement that has been processed by the originating sensor for clutter rejection and signal-to-noise parameters, but has not been associated with a track. (2) A measurement report from a sensor that has not been successfully associated with an existing composite or single-sensor track and which may lead to the detection of a new entity.
<b>Unclassified Internet Protocol Router Network</b>	<b>NIPRNET</b>	<p>The NIPRNET is a network of Internet protocol routers owned by the Department of Defense (DOD). The Defense Information Systems Agency (DISA), NIPRNET is used to exchange unclassified but sensitive information between "internal" users as well as providing users access to the Internet.</p> <p><a href="http://en.wikipedia.org/wiki/NIPRNET">http://en.wikipedia.org/wiki/NIPRNET</a></p>
<b>Unicode</b>		<p>A standard defined by the Unicode Consortium. Unicode uses a 16-bit code page that maps digits to characters in all languages around the world. Because 16 bits covers 32,768 codes, Unicode is large enough to include characters from all languages, with the exception of ideographic languages that have a different character for every concept. Chinese. For more information, see <a href="http://www.unicode.org/">http://www.unicode.org/</a>. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/guide/unicode/">http://java.sun.com/j2ee/1.4/docs/guide/unicode/</a>)</p>
<b>Unified Class Library</b>		<p>With the introduction of <a href="#">.NET</a>, Microsoft redesigned the access to common system <a href="#">components</a> and <a href="#">services</a> such as <a href="#">XML web services</a>, Enterprise Services, ADO.NET, and <a href="#">XML</a> by creating a single object-oriented library. All Microsoft Visual <a href="#">.NET</a> languages (Visual Basic, C++, J#, C#, etc.) have access to this library. To make these objects available within the various languages, Microsoft provided infrastructure such as hierarchical namespaces, structures, types, and common objects like collections.</p> <p>The following illustration highlights the design and intent of the unified class library; it is not definitive. For a complete discussion see Microsoft's <a href="#">.NET Class Library</a>. In essence, Microsoft has developed a rich class library with a public and a private aspect. Language neutrality is obtained by creating a functionally identical name space for each language group. With minimal training, programmers can use the unified class libraries from each Visual Basic language, making the reuse of the core functionality a reality. The unified class library is, in essence, a model on which other application libraries can be modeled.</p>



**Unified Modeling Language**

**UML**

A standard notation for modeling real-world objects as a first step in developing an object-oriented design methodology. UML is defined by the Object Management Group (OMG). (Source: <http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/top>)

**Uniform Resource Identifier**

**URI**

An encoded address that represents any web resource, such as an HTML document, image, video clip, or audio file. Unlike a URL or a [URN](#), which are concrete entities, a URI is an abstract superclass. (Source: <http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/top>)

A Uniform Resource Identifier (URI) is an Internet protocol element consisting of a short string of characters that conform to a certain syntax. The string comprises a name or address that can be used to refer to a resource. It is a fundamental component of the World Wide Web.

[http://en.wikipedia.org/wiki/Uniform\\_Resource\\_Identifier](http://en.wikipedia.org/wiki/Uniform_Resource_Identifier)

**Uniform Resource Locator**

**URL**

A sequence of characters that represents information resources on a computer or in a network such as a web page. This sequence of characters includes (1) the abbreviated name of the protocol used to access the information and (2) the information used by the protocol to locate the information resource. (Source: <http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/top>)

**Uniform Resource**

**URN**

A name that uniquely identifies a web service to a client. (Source: <http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/top>)

<b>Name</b>	)	
<b>UNIQUE Key Integrity Constraints</b>		A unique key integrity constraint requires that every value in a column or set of columns (key) be unique. No two rows of a table have duplicate values in a specified column or set of columns. <a href="http://www.lc.leidenuniv.nl/awcourse/oracle/server.920/a96524/c22integ.htm">http://www.lc.leidenuniv.nl/awcourse/oracle/server.920/a96524/c22integ.htm</a>
<b>Universal Description, Discovery, and Integration</b>	<b>UDDI</b>	An industry initiative to create a platform-independent, open framework for describing services, discovering businesses, and integrating business services using the Internet, as well as a registry. It is being developed by a consortium. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Universal Joint Task List</b>	<b>UJTL</b>	The comprehensive list of tasks at the Strategic and Operational levels of war. A menu of capabilities (tasks with associated conditions and standards, i.e., the tools) that a joint force commander may select to accomplish the assigned mission. Once identified as essential to mission accomplishment, the tasks are reflected in the command joint mission essential task list.
<b>Universal Multiple-Octet Coded Character Set</b>	<b>UCS</b>	
<b>Universal Navy Task List</b>	<b>UNTL</b>	UNTL = <a href="#">UJTL</a> + NTTL
<b>Universal Time. Similar to GMT or Zulu times.</b>	<b>UTC</b>	
<b>Unknown (contact)</b>	<b>UNK</b>	
<b>Unstructured Data</b>		Little or no metadata
<b>Use-Case</b>		A sequence of actions, performed by a system, that yields a result of value to a user. A set of actions, including variants, that a system performs that yields an observable result of value to a particular actor. (UML)
<b>Use-Case Model</b>		A model that describes a system's functional requirements in terms of use cases. Consists of all the actors and all the various use cases by which the actor interact with the system, thereby describing the total functional behavior of the system.
<b>Use-Case Survey</b>		A list of names and perhaps brief descriptions of use cases associated with a system, component, or other physical entity.
<b>User (Security)</b>		An individual or application program identity that has been authenticated. A user can have a set of roles associated with that identity, which entitles the user to access all resources protected by those roles.
<b>User Agent</b>		A system entity that is used by an end user to access a web site. A user agent provides a runtime environment for distributed application components on the client device. (Source: <a href="http://www.oasis-open.org/committees/standards/TC452/UCR/UCR.html">http://www.oasis-</a>

[open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf](http://open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf) )

**User Datagram Protocol**      **UDP**

**User-Defined Operation Picture**      **UDOP**

**User-Facing Services**      **UFS**

A software component that receives a UFS request from the portal. It returns a UFS response that forms the basis for display, usually in a markup language such as HTML or WML, and produces visual output in a portal.

## V

### **VBScript**

## V

A programming language developed by Microsoft that is similar to JavaScript. It is used to embed code into HTML pages. It is actually a subset of Microsoft's Visual Basic.

### **Vector Product Format VPF**

### **Vendor**

Any person, organization, or automated asset that interfaces with the information environment as a service consumer or service provider.

### **Video TeleConferencing VTC**

A meeting among persons where telephony and closed-circuit television technologies are used simultaneously. Video teleconference communication is multi-way and synchronous, as it would be if all parties were in the same room. (Source: [http://en.wikipedia.org/wiki/Video\\_teleconference](http://en.wikipedia.org/wiki/Video_teleconference) )

### **Virtual Private Network VPN**

### **Voice Over Internet Protocol VoIP**

Voice over Internet Protocol is a set of standards and technologies that allow voice to be transmitted over IP networks.

### **VoiceXML**

VoiceXML (VXML) is the W3C's standard XML format for specifying interactive voice dialogues between a human and a computer. It is fully analogous to HTML, and brings the same advantages of web application development and deployment to voice applications that HTML brings to visual applications. Just as HTML documents are interpreted by a visual web browser, VoiceXML documents are interpreted by a voice browser. A common architecture is to deploy banks of voice browsers attached to the public switched telephone network (PSTN) so that users can simply pick up a phone to interact with voice applications. VoiceXML has tags that instruct the voice browser to provide speech synthesis, automatic speech recognition, dialog management, and soundfile playback.



# W

## W

<b>Web Application Archive</b>	<b>WAR</b>	A <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">JAR</a> archive that contains a web module. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Warfare System</b>		All shipboard tactical systems and tactical mission-support systems, such as weapons, sensors, communication, navigation, aviation support systems, mission planning, intelligence, surveillance and reconnaissance, exterior communications, topside design, and warfare system networks. (Source: N00178-04-R-2010, Warfare Systems Support)
<b>Web Application</b>		A collection of components that can be bundled together and run in multiple containers from multiple servers. An application written for the Internet, including those built with Java technologies such as Java Servlets and JSPs, and those built with non-Java technologies such as CGI and Perl. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Web Browser</b>		A client program that initiates requests to a web server and displays the information that the server returns. (Source: <a href="http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/top">http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/top</a> )
<b>Web Container</b>		A container that implements the web-component contract of the J2EE architecture. This contract specifies an environment for web components that includes security, concurrency, life-cycle management, transaction management, and other services. A web container provides the same services as a JSP container as well as a federated J2EE platform APIs. A web container is provided by a web or J2EE server. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Web Coverage Services or Web Coverage Server</b>	<b>WCS</b>	
<b>Web Distributed Authoring and Versioning</b>	<b>Web-DAV</b>	
<b>Web Feature Services or Web Feature Server</b>	<b>WFS</b>	
<b>Web Mapping Service</b>	<b>WMS</b>	
<b>Web Module</b>		A deployable unit that consists of one or more web components, other resources, and a web application descriptor. The web module is contained in a hierarchy of directories and files in a standard web application archive. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Web Notification</b>	<b>WNS</b>	

## Services

### Web Page

A document created with [HTML](#) (HyperText Markup Language) that is part of a group of hypertext documents and resources available on the World Wide Web. Collectively, these documents and resources form what is called a web site. You can read HTML documents that reside somewhere on the Internet or on your local hard drive. To view HTML documents, you need software called a web browser. Web pages can contain hypertext links to other places within the same web site, to other documents at the same web site, or to documents at other web sites.

### Web Server

Software that provides services to access the Internet, an intranet, or an extranet. A web server hosts web pages and provides support for HTTP and other protocols, and executes server-side programs (such as [CGI](#) scripts) that perform certain functions. In the [J2EE](#) architecture, a web server provides services to a web container. For example, a web container typically relies on a web server to provide [HTTP](#) message handling. The J2EE architecture assumes that a web container is hosted by a web server from the same vendor, so it does not specify the relationship between these two entities. A web server can host one or more web containers. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

### Web Server Provider

A vendor that supplies a web server. (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> )

### Web Service

An application that exists in a distributed environment, such as the Internet. A web service accepts a request, performs its function based on the request, and returns a response. The request and the response can be part of the same operation, or they can occur separately, in which case the consumer does not need to wait for a response. The request and the response usually take the form of XML, a portable data-interchange format, and are delivered over a network protocol, such as [HTTP](#). (Source: <http://java.sun.com/j2ee/1.4/docs/glossary.html> ) -OR- A web service is a software application or component that is identified by a [URI](#) and can be accessed over the Internet. It uses a vendor/platform/language-neutral data interchange format to invoke the service and supply the response. The service uses a message exchange pattern that is sufficiently well defined to be processed by a software application. The service interfaces and binding are capable of being defined, described, and discovered by XML artifacts. It supports discovery.

### Web Service Choreography Interface

WS-CI

### Web Service Flow Language

WSFL

### Web Service Interface

### Web Services Description Language

WSDL

An XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information. The operations and messages are described abstractly, and are then bound to a concrete network protocol and message format to define an endpoint.

### Web Services Execution Environment

WSMX

### Web Services for Interactive Applications

WSIA

### Web Services for Remote Portlets

WSRP

The WSRP specification defines a web-service interface for interacting with interactive presentation-oriented web services. It has been produced through the joint efforts of the Web Services for Interactive Applications and the Web Services for Remote Portals (WSRP) OASIS Technical Committees. Scenarios that motivate WSRP functionality include: (1) portal servers providing portlets as presentation-oriented web services that can be

aggregation engines; (2) portal servers consuming presentation-oriented web services provided by portal content providers and integrating them into a portal framework. (Source: <http://www.oasis-open.org/committees/download.php/3343/oasis-200304-wsrp-specification-1.0.pdf> )

<b>Web Services Interoperability</b>	<b>WS-I</b>	
<b>Web Services Modeling Ontology</b>	<b>WSMO</b>	
<b>Web Services Reliable Messaging</b>	<b>WSRM</b>	<a href="#">XACML</a> supports exchange of access control information using XML.
<b>Web Site</b>		A web site, website, or WWW site (often shortened to just "site") is a collection of web pages: i.e., HTML documents accessible via <a href="#">HTTP</a> on the Internet. All publicly accessible web sites in existence comprise the World Wide Web. The pages of a web site are accessed from a common root URL, the homepage, and usually reside on the same physical server. The URLs of the pages organize them into a hierarchy, although the hyperlinks control how the reader perceives the overall structure and how the traffic flows between the different pages. (Source: <a href="http://en.wikipedia.org/wiki/web_site">http://en.wikipedia.org/wiki/web_site</a> )
<b>Web-to-Web</b>	<b>W2W</b>	
<b>Well-Formed</b>		An XML document that is syntactically correct. It does not have any angle brackets that are not part of a tag, nor does it have an ending tag or are self-ending, and all tags are fully nested. Knowing that a document is well-formed is not sufficient to process it. However, a well-formed document may not be valid. To determine that, you need a parser and a <a href="#">DTD</a> . (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>Wire Protocol</b>		In a network, it is the mechanism for transmitting data from point a. to point b. It often refers to a distributed protocol such as <a href="#">SOAP</a> , <a href="#">CORBA</a> or <a href="#">RMI</a> , which is software only and which invokes the running of processes on remote servers. <a href="http://www.techweb.com/encyclopedia/defineterm.jhtml?term=wire+protocol">http://www.techweb.com/encyclopedia/defineterm.jhtml?term=wire+protocol</a>
<b>Wireless Application Protocol</b>	<b>WAP</b>	WAP is an open international standard for applications that use wireless communication, such as Internet access on a mobile phone. WAP provides services equivalent to a web browser with some mobile-specific additions. It is specifically designed to address the limitations of very small portable devices. During its first years of existence, it suffered from considerable negative media attention and has been criticised heavily for its design choices and limitations. (Source: <a href="http://en.wikipedia.org/wiki/WAP">http://en.wikipedia.org/wiki/WAP</a> )
<b>Wireless Markup Language</b>	<b>WML</b>	WML is the primary content format for devices that implement the WAP (Wireless Application Protocol). It is based on XML, such as mobile phones. (Source: <a href="http://en.wikipedia.org/wiki/Wireless_Markup_Language">http://en.wikipedia.org/wiki/Wireless_Markup_Language</a> )
<b>Wisdom</b>		Knowledge with information so thoroughly assimilated as to have produced sagacity, judgment, and insight. The ability to use knowledge for a purpose.
<b>Workflow Application</b>		One where various applications and components must process data to complete a task. For example, a purchase order that moves through various departments for authorization and eventual purchase. The process is treated as messages, which are put into various queues for processing. A workflow process involves creating, executing, and update. You can introduce new components into the operation without changing any code.
<b>Workflow Management Coalition</b>	<b>WfMC</b>	

<b>World Wide Web</b>	<b>WWW</b>	The World Wide Web ("WWW," or simply "web") is an information space in which items of interest, resources, are identified by global identifiers called Uniform Resource Identifiers ( <a href="#">URI</a> ). The term is often used as a synonym for the Internet, but the web is actually a service that operates over the Internet. (Source: <a href="http://en.wikipedia.org/wiki/World_Wide_web">http://en.wikipedia.org/wiki/World_Wide_web</a> )
<b>World Wide Web Consortium</b>	<b>W3C</b>	The international body that governs Internet standards. Its web site is <a href="http://www.w3.org/">http://www.w3.org/</a> .
<b>WSRP Service</b>		Presentation-oriented, interactive web services that can be aggregated by consuming applications. (Source: WSRP Specification 1.0 Glossary )

# X

## X

<b>Xalan Processor</b>		An <a href="#">XSLT</a> processor that is part of the Apache project. (Source: <a href="http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/topics/">http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/topics/</a> )
<b>XIS Integration Layer</b>	<b>XIL</b>	
<b>XLANG</b>		Is a block-structured language with basic control flow structures such as sequence, switch (for conditional), while (for looping), all (for parallel routing), and pick (for race conditions based on timing or external triggers).
<b>XML Gallery</b>		
<b>XML Information Resources</b>		<a href="#">Document Type Definitions</a> (DTD) or <a href="#">XML Schema Documents</a> (XSD) files.
<b>XML Key Management Specification</b>	<b>XKMS</b>	
<b>XML Linking Language</b>	<b>XLink</b>	
<b>XML Process Definition Language</b>	<b>XPDL</b>	Is the language proposed by the Workflow Management Coalition ( <a href="#">WfMC</a> ) to interchange process definitions between different workflow products. To goal of XPDL is to provide a Lingua Franca for the workflow domain allowing import and export process definitions between a variety of tools ranging from workflow management systems to modeling and simulation tools.
<b>XML Schema</b>		A database-inspired method for specifying constraints on <a href="#">XML</a> documents using an XML-based language to address deficiencies in <a href="#">DTDs</a> , such as the inability to constrain the kinds of data that can occur in a particular element. Because schemas are founded on XML, they are hierarchical. Thus it is easier to create an unambiguous schema and it is possible to determine the scope over which a comment is meant to apply. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>XML Schema Definition</b>	<b>XSD</b>	The <a href="#">W3C</a> specification for defining the structure, content, and semantics of XML documents. (Source: <a href="http://java.sun.com/j2ee/1.4/docs/glossary.html">http://java.sun.com/j2ee/1.4/docs/glossary.html</a> )
<b>XML Path Language</b>	<b>XPath</b>	XML Path. An <a href="#">XSL</a> sublanguage designed to uniquely identify or address parts of a source XML document with <a href="#">XSLT</a> . XPath also provides basic facilities for manipulation of strings, numbers, and Booleans. (Source: <a href="http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/topics/">http://publib.boulder.ibm.com/infocenter/adiehelp/index.jsp?topic=/com.ibm.wsinted.glossary.doc/topics/</a> )

**Xalan-Java**      [XSLT](#) Processor Made by Apache.

## Y

**Yet Another Workflow  
Language**      **YAWL**

## Y

An open source workflow language and environment supported by the Centre for Information Technology Innovation ([CITI](#))





# ***Index***

## **A**

ASD ..... 112

## **C**

Confidentiality ..... 112

## **D**

Data ..... 112

Data architect ..... 100

Data Asset ..... 100

DDMS ..... 112

DDMS Guidance ..... 112

DoD Metadata Registry ..... 100

DTDs ..... 112

## **E**

Enterprise Checklist ..... 16

## **M**

Metadata Registry ..... 100

## **W**

Warfare Reference Model ..... 112

Web Services Description Language ..... 112

## **X**

XML ..... 112

XML Schema Definition ..... 112